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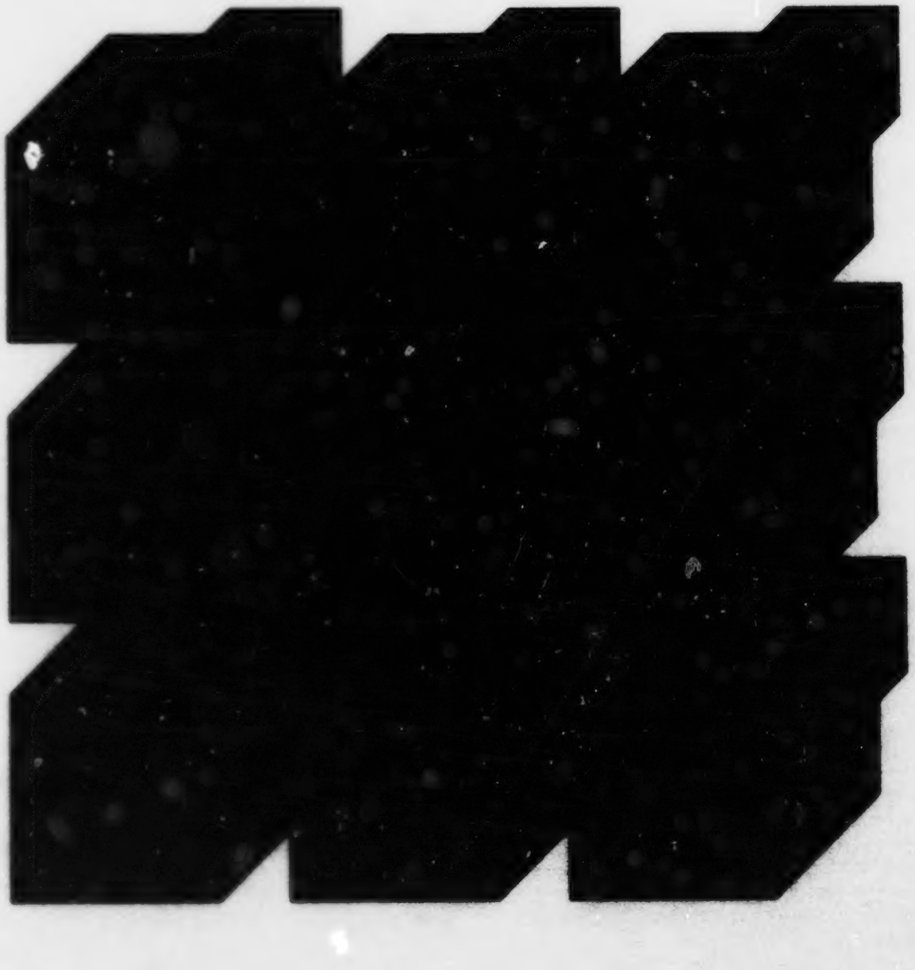

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DISCUSSION PAPER NO. 250

Apprenticeship Training in Canada: A Theoretical and Empirical Analysis

By Klaus Weiermair

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RÉSUMÉ

Les Canadiens se sont beaucoup intéressés, au cours des années 70, à la qualité des programmes de formation de la main-d'oeuvre tant dans le secteur privé que dans le secteur public et tant du point de vue des niveaux de connaissances visés que de celui de l'équilibre recherché entre la formation dispensée dans les institutions et la formation en cours d'emploi. Pour atténuer les pénuries de travailleurs qualifiés et accentuer la formation en cours d'emploi, le gouvernement fédéral et les provinces avaient pris simultanément toute une série de mesures visant à renforcer la formation première reçue dans un milieu industriel, soit l'apprentissage. Le présent document fait un tour d'horizon de l'évolution de l'apprentissage au Canada et évalue son importance relative pour la formation de la main-d'oeuvre aux métiers industriels (chapitres I et II). Ensuite, l'auteur cherche à établir comment les programmes d'apprentissage ont changé face à l'évolution de la conjoncture et aux mesures de stimulation économique dans les dix provinces entre 1960 et 1980 (chapitres III et IV). Les résultats et les conclusions de l'étude sont axés sur la création d'un programme d'apprentissage aux normes uniformes à l'échelle nationale, qui comporterait un meilleur partage du financement et de la gestion de la formation (chapitre V).

ABSTRACT

Throughout the seventies, there has been widespread concern in Canada about the adequacy of private and public manpower training efforts with respect to both overall levels and the appropriate mix between institutional and industrial-type training. In order to lower perceived skill shortages and raise the amount of industrial-type training, the provincial and the federal government have introduced at the same time a series of measures aimed at strengthening initial industrial-type training such as apprenticeship. This paper provides an overall description of the historical development of apprenticeship training in Canada and assesses its relative importance in the process of formation of industrial skills (Chapters I and II). Subsequent to that, an attempt is made to evaluate the responsiveness of apprenticeship training to different economic circumstances and economic incentives throughout Canada's ten different provincial systems of apprenticeship training over the period 1960-1980 (Chapters III and IV). The paper's findings and conclusions center on the development of a national and standardized apprenticeship training programme with an improved sharing of financing and control of training among the partners to the training relationship and are reported in Chapter V.

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Introduction

Recent studies of the Canadian labour market have called attention to the shortcomings of this country's manpower training system.[1] Concern has been expressed that the mismatching of job requirements and workers' skills has given rise to both unemployment and costly vacancies: increasing structural unemployment in the 1970's culminated, at decade's end, in widespread skill shortages in a number of occupations. While it is true that massive cyclical unemployment is now the overwhelming characteristic of the Canadian labour market, the fact remains that if we are to respond effectively to the demands of the subsequent upswing, to shifts in the industrial composition of economic activity, and to technological change, careful attention must be paid to the skills of the future work force.

Such issues have been of continuing concern to the Economic Council of Canada since its inception in the early 1960s. The evaluation of manpower training programs was a major theme in Design for Decision Making, for example, in 1971, and was addressed again in 1976, in People and Jobs. More recently, the Council published In Short Supply: Jobs and Skills in the 1980s, and the present study is part of the overall research effort that culminated in that publication. More specifically, it relates rather closely to chapter 8 of In Short Supply where an attempt was made to raise some issues concerning Canada's training system in general and, in particular, that part of it which is government sponsored. Those issues include the appropriate division of responsibilities among governments, employers and individuals in the provision and acquisition of training; the relationship between academic and vocational training; and the blend of institutional and on-the-job components of training. In the present study, they are addressed in some detail in the context of an important--though in Canada ill-developed--form of training, namely, apprenticeship.

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[1] Notably, Employment and Immigration Canada, Labour Market Development in the 1980's (Ottawa: Minister of Supply and Services, 1981), and Parliamentary Task Force on Employment Opportunities for the 1980's, Work for Tomorrow (Ottawa: House of Commons, 1981).

The study attempts to bring to bear some modifications of traditional human capital theory and, despite data limitations of the severest kind, to provide some empirical analysis. In particular, however, it relies heavily on institutional description and analysis to explain the complex interplay of factors which have shaped the evolution of Canada's apprenticeship training system and the characteristics it displays today. The next section of the present provides a historical background, while the bulk of the institutional analysis is contained in chapter II. In chapter III are modifications and extensions of human capital theory as applied to apprenticeship, including an analysis of general versus specific training, the role of employer search costs, and the "make or buy" decision. An attempt is made in chapter IV to estimate empirically the determinants of apprenticeship training, while chapter V provides conclusions and policy recommendations.

The perspective required to undertake the institutional analysis of this study has benefited from the opportunity to consult a variety of people involved in the apprenticeship system: provincial government apprenticeship officials in almost every province; officials in various government departments of education and labour; members of training boards; researchers; college administrators; federal officials; employers; union representatives; and (yes!) apprentices.

CHAPTER I

A Historical Perspective of Apprenticeship Training in Canada

Canadian vocational education in general, and apprenticeship training in particular, has varied in response to the major waves of industrialization and initiatives emerging from the private sector and from provincial and federal governments.

Apprenticeship training in the country appears to date from 1668, when Bishop Laval opened two trade schools in St. Joachim and Quebec City.[2] After a short expansion of trade training by French colonists towards the end of the seventeenth century, educational expansion came to a virtual halt for the next hundred years. Among the first pieces of legislation dealing with the provision of formal apprenticeship in Upper Canada was the Education and Support of Orphan Children Act (1799). This act is interesting in so far as it shows the prevailing perceptions regarding apprenticeship in the context of social and education policy, perceptions which appear to have changed only marginally over the past 200 years. For, as distinct from Europe or Japan, but similar to the United States, apprenticeship historically has been considered in Canada as a welfare or social policy measure directed at society's marginal or outcast elements such as orphans, young people with criminal records and slow learners. They were, in a sense, the predecessors of today's marginal work force which drifts in and out of employment buttressed by a host of publicly-funded vocational training and other social programmes. It seems that apprenticeship training in Canada never has been able to completely change this stigma, for it has always been considered the lowest form of training or education, to be mounted mainly to satisfy the needs of underprivileged groups. How it came to that and why some observers continue to criticize our existing apprenticeship training system for producing only semi-skilled as opposed to fully skilled or highly skilled workers,[3] can, in part, be explained by the foundations which were laid in the 19th century.

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[2] For a detailed account of the origins of vocational education in Canada, see:

D.R. Young and A.V. Machinski, An Historical Survey of Vocational Education in Canada (Ottawa: Canadian Vocational Association, 1974).

Phillips, Charles Edward, Public Secondary Education in Canada (Toronto: W.J. Gage, 1955).

First of all, with the possible exception of Ontario, Canadian industry throughout most of the 19th century did not have sophisticated skill requirements. Semi-skilled workers as opposed to those fully trained in broadly defined occupations were generally sufficient. Rural settlement required a great deal of mobility and flexibility in the deployment of skills which led to quick and partial supply responses in the form of individual vocational courses being offered either within elementary and secondary education in rural schools or through charity organizations. Courses in bookkeeping, services, knitting, net-making, etc., became either part of the curriculum in general education or were offered through private schools, missionaries and the like.[4]

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[3] See, for example:

D.P. Kiesewalter, "Vocational Training and Skill Development, A Comparison Between Canada and West Germany", Canadian Vocational Journal, Vol. 14, No. 1, May 1978, pp. 15-35.

The second factor was the gradual introduction of universal education, inspired by its expansion south of the border, which brought along with it the belief in the supremacy of academic over vocational education. This was particularly dominant in Ontario, Quebec and the Maritime provinces.

The third factor stemmed from differences between business and unions regarding training. Informal apprenticeships had begun during the 19th century in private industry but these arrangements by the end of the century were being heavily attacked by unions. There were good reasons for unions to be concerned about these types of training which often involved exploitive attitudes similar to those towards child and female labour at the time. Indeed, employers blatantly hired apprentices as a form of cheap labour into lengthy company programmes which, in fact, offered little real training. Consequently, unions either opposed apprenticeship training or, in the case of the International Typographers' Union countered with their own training programmes.[5] Such efforts, in turn, were unacceptable to companies on the grounds that they were restrictive and intended to raise wages.

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[4] Young and Machinski, Ibid., pp. 4-6.

Thus at the turn of the century, the stage was already set for an unfriendly environment for vocational training. With public ignorance and misperception as to the usefulness of apprenticeship training on account of its own unorganized and ad-hoc historical development and as an issue of conflict in industrial relations, the only missing ingredient was constitutional uncertainty with respect to role and authority over vocational training between competing levels of government.

The latter became particularly evident during the first decade of the 20th century when Canada embarked on her first period of accelerated industrialization. This growth, of course, required increased supplies of vocational and technical skills. Under public pressures from labour and business, the Dominion government agreed in 1901 to appoint a Minister of Industrial Education and to establish a Royal Commission which would study the needs of vocational and technical education in

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[5] B. Peterson, "A Brief History of Apprenticeship in Ontario," Elements of Technology, February 1974, pp. 8, 9.

Canada. It took over nine years for the Commission to become established and more than three years until a final report was written. The Commission recognized the need for more occupational training and established a number of guidelines on the development, control, and financing of vocational and technical education. The Commission's conclusions included the following:

> occupational training was to be controlled provincially;
> training would be financed by individuals, and local, provincial, and federal governments;
> training was to be carried out in cordial cooperation with systems of education using existing facilities to the fullest; and
> responsibility would rest with a network of local, provincial and federal advisory boards and commissions.[6]

The Commission findings did raise public awareness on the lack of practical training, notably apprenticeship, which had practically ceased to exist. An increased level of skill development was ushered in when financial assistance for vocational training was provided under the Agricultural Aid Act (1912) and the Agricultural Instruction Act (1913).

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[6] A thorough description and analysis of these provisions is provided in:

D. Glendenning, A Review of Federal Legislation Relating to Technical and Vocational Education in Canada (Ottawa: Programmes Branch, Department of Manpower and Immigration, 1968), p. 7 ff.

Altogether, $12 million was distributed over a period of 12 years. Delayed implementation, great disparity and diversity in development and control, with the latter dominated in part by churches of various denominations, however, made these first efforts highly ineffective measures to shore up industrial training in Canada.

Attempts were made to strengthen formal vocational schooling in technical and composite high schools and cooperative industrial schools with the passage of the Ontario government's Industrial Education Act (1911) and the federal Technical Education Act (1919). According to one observer of the historical development of vocational education in Canada, both acts did succeed in reinforcing the role of the provinces and allowed them to greatly expand their capacities. This was particularly the case for Ontario, which used all available federal grants and gradually merged general and vocational education under the leadership and guidelines of the formal general system.[7]

During the twenties, Canadian employer organizations pressured governments to improve the transition from school to work, to provide better skill training, and to re-establish apprenticeship training. In 1928, the Canadian Building and Construction Association was successful in persuading the Ontario government to restore formal apprenticeship through the passage of an apprenticeship act, which was the first of its kind in Canada. Unfortunately, this development did not immediately lead to a significant expansion of training. In the first place, the initial programme director held negative views towards apprenticeship training and was not supportive of the programme. Moreover, the onset of the depression dealt a serious blow to apprenticeship training in Ontario and when World War II started, only a few hundred apprentices existed in the province.

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[7] B. Peterson, Ibid., pp. 7, 8.

Although apprenticeship training did not expand appreciably during the war, there were massive occupational training efforts channeled in part through the War Emergency Training Act (1940). Through the influence of the Vocational Training Coordination Act (1942), which allowed the federal Department of Labour to negotiate individually with the provinces for the development and funding of vocational education, federal-provincial apprenticeship training agreements were set up. The latter were for a ten-year period and required each province to have an apprenticeship act. This meant that New Brunswick, Manitoba, Saskatchewan and Alberta had to introduce new apprenticeship legislation in 1944. The agreements stipulated, furthermore, that apprentices had to be registered with provincial training branches, that they had to be under a written indenture to employers, an industry or other responsible organizations, and that they were to be given a provincial certificate of apprenticeship after completion of training. All costs associated with the apprenticeship training system were to be shared equally between the federal and provincial governments. The agreements were renewed in 1954 for another 10 year period. Given the lack of appropriate training facilities, the federal government also began to subsidize the expansion of vocational schools, technical institutes and colleges through the Vocational Schools Assistance Agreement in 1945 which was renewed in 1950 and revised in 1954.[8]

The immediate post-war period was the real beginning of apprenticeship training in Canada. Certainly, this is indicated by the enrolment numbers in Table 1. Furthermore, it was also in these years that basic philosophies regarding manpower and education policies were formed. In many instances, they were simply derived from existing economic circumstances. On the demand side, the period from 1947 to 1961 was characterized by a mixture of industrial growth and resource booms. These initially required higher skills in manufacturing, but later, more mobile and less highly skilled workers in primary industries were needed. On the supply side, governments had to cope with the re-integration of war veterans into the work force, a secular rise in school dropouts from secondary schools, and inadequate and insufficient schooling facilities.[9] The response of the federal government to these structural problems, which manifested themselves in growing unemployment and skill shortages was to induce more occupational training and retraining according to a system by which varying amounts of provincial training outlays were refunded.[10] In addition, high levels of immigration, stemming from liberal immigration policies, closed a large proportion of the existing skills gaps.

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[8] Young and Machinski, Ibid., p. 29.

The procurement of off-shore skills combined with short-term measures to upgrade, train and retrain parts of the labour force and the provision of subsidies to the provinces for expansion of schooling facilities, influenced greatly the pattern of labour market intervention in the sixties and seventies. The following factors played significant parts in this development.

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[9] Ibid., p. 35.

[10] Under the various schedules and sharing arrangements of the two agreements signed in this period, we find for example, a 50% cost sharing for training outlays for unemployed youth, foremen and supervisors and disabled which rose to 75% in the case of workers in defence and to 100% for service tradesmen, government employees and rehabilitation of veterans (Glendenning, op. cit., pp. 47-49).

1) Highly skilled immigrant workers and journeymen entered the labour force in the 15-year period following the war. This was for most firms, notably those in manufacturing, the cheapest method of skill acquisition. Heavy reliance on immigration, in turn, reduced the individual and collective will to develop a strong, diversified and socially integrated skill training system.[11]

2) Given its target clientele, occupational training was to serve mainly those with difficulties in labour market adjustment. Hence, manpower training including apprenticeship, soon developed into a system which provided only low to medium level skills, instead of the high level skills which, judging by foreign experience, it would have been

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[11] The OECD in its examiners' report on Canada's education system was similarly astonished over the lack of any thorough reform in Canadian education comparable to most other industrialized nations. For reference, see:

OECD, Review of National Policies for Education: Canada (Paris: OECD, 1974).

OECD, Policies for Apprenticeship (Paris: OECD, 1979), p. 33 ff.

For further reference, see also: Helen Buckley and Soren Nielsen, Immigration and the Canadian Labour Market, (Ottawa, Department of Manpower and Immigration, 1976).

potentially capable of producing. This, in turn, gave educational authorities in various provinces all the more rationale to treat apprenticeship training as a relatively unimportant adjunct to the whole system of education and training to be put on the low end of the scale of educational priorities.[12]

3) Given the federal government's constitutional role in manpower training and vocational education and the provinces' entire control over educational matters, vocational education, including apprenticeship training, very quickly turned into what is otherwise known as a "regulated industry."

In this context, it is worth noting parenthetically that certain characteristics of regulated industries are particularly relevant to our current concern. First, the principal agents of a regulated industry can make best use of regulation or incentive programmes if they can somehow succeed in impressing goals and policies of their own upon those who regulate or otherwise control through the provision of subsidies. This might be achieved through informal networks and information exchange between professionals or, even better, through the exchange of personnel between federal and provincial ministries (in this case, manpower and education). While not all provinces had the capacities and skill to do so, there is evidence that at least Ontario mastered this art quite well and to its best advantage.[13] Second, regulation tends to produce the so-called 'Averch/Johnson' effect which in practice amounts to an increase of inefficiencies from regulation.[14] Translated into the field of vocational education, this would mean that easily available money from federal sources could, and probably did lead to a considerable proliferation and expansion of programmes and post-secondary institutions beyond the social optimum by inducing provinces to expand opportunistically in the direction of federal support.

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[12] For an interesting account of this attitude by provincial educational authorities in Ontario for the period 1944-71, see:

Peterson, op. cit.

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[13] See, for example:

Peterson's detailed account on the transfer of personnel and educational philosophies between the federal Department of Manpower and Ontario's Department of Education, Peterson, op. cit., p. 18.

[14] For a more detailed discussion, see:

Harvey Averch and Leland L. Johnson, "Behaviour of the Firms Under Regulatory Constraint," The American Economic Review, Vol. 52, December 1962, pp. 1053-1069.

In recognition of this fact, the federal government frequently changed performance rules and grants criteria. However, as students of regulation have noted, structure is relatively more important than rules.[15]

A good example as to how federal/provincial agreements over this first post-war period have affected particular programmes and/or interprovincial distributions of vocational schooling and training, can be seen from Table 1. Annual total enrolment in apprenticeship training shows a gradual increase over this period and at the same time records three major enrolment jumps in 1945, 1957 and 1963, all of which were years in which major federal/provincial agreements were signed. Of a total of $50 million assistance given to the provinces under the Vocational Schools Assistance programme (1945-57) and the Technical Training Agreement (1957-61), Ontario captured $17 million, or 34%, in comparison to most of the other provinces which received between $500,000 and $5 million.

Although the sixties can be interpreted in many ways as a carry-over from the fifties, at least as far as the underlying structural problems in vocational training and high level skill supplies were concerned, this decade was significantly different in that it saw the largest expansion of both general and vocational schooling in Canada's history. The expansion was facilitated by two important pieces of federal legislation, the Technical and Vocational Training Assistance Act (TVTA) of 1960 and the Adult Occupational Training Act (AOTA) of 1967.

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[15] See for example:

Alfred E. Kahn, The Economics of Regulation, Vols. I and II (New York: John Wiley & Sons, 1970).

As before, passage was spurred by economic conditions: high rates of unemployment towards the end of the fifties, as well as a general recognition that a more coordinated and comprehensive approach in vocational education was called for.

This comprehensiveness was interpreted as a coverage of all potential manpower training needs requiring federal attention and funding.* *It contained provisions for a federal-provincial shared cost program involving capital expenditures on training institutions in all provinces and operating expenditures for particular manpower categories. Under TVTA, the following three broad categories were distinguished:

a) Youth in secondary schooling who intended to enter the labour force immediately following completion of high school. To the extent that high schools developed a definite occupational objective they were eligible for a 50% federal subsidy.[16] This consequently led to a rapid expansion of technical/vocational and composite high school education.

b) Youth and adults who had completed secondary education but desired training prior to entering the labour market. Programmes which were considered suitable to meet this training demand had to contain at least 2400 hours of instruction and be designed to prepare individuals to enter the labour force as "technicians." Again, 50% of provincial expenditures were refundable under the agreement. The effect of these measures was a phenomenal growth of community colleges and technical institutes, particularly in Quebec.

c) Adults who had left the regular school system and were employed or looking for employment and wished to receive training in a particular trade or occupation. Programmes in this category were to provide occupational training for preparation for, or progress in, an occupation. There was no stipulation as to the form of training. It could be full-time, part-time, sandwich, day-release or block release training, on-the-job or any other possible variation suitable to increase individual productivity. Apprenticeship training also qualified under this classification.

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[16] The performance rule here was that at least 50% of the time spent in school had to be occupational preparation and related theoretical instruction, i.e. mathematics, science and communication skills.

Compared to the previous categories, the success of programmes under (c) was rather mixed, which was in a large part due to a combination of provincial education philosophies, jurisdictional uncertainty and vague programme specifications and descriptions.

In addition, the federal government introduced six other programmes which were designed to round out the total manpower training subsidy package by including special needs categories such as the unemployed, special industrial needs (training), disabled persons, vocational teacher training, manpower training in federal departments and agencies, and student aid. Compared to anything comparable in Canada's history of vocational education, TVTA was indeed a magaproject. During the first two years of the act alone, Ottawa spent over $250 million, five times the amount which had been spent before over a period of fifteen years (1945-59). Total expenditures under TVTA between 1961-67 amounted to $900 million with an average of close to 500,000 individuals receiving technical and vocational training in high schools under the act during the mid-sixties.[17]

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[17] Economic Council of Canada, Eighth Annual Review (Ottawa: Queen's Printer, 1971), pp. 100, 101.

The relative impact of federal subsidies upon the organization of various forms of vocational schooling can be gained by comparing the growth in alternative forms of vocational schooling/training over the period 1960-61 to 1966-67. For example, apprenticeship registrations, full-time enrolment in technical, vocational and composite high schools, full-time enrolment in trade and vocational schools, post-secondary non-university enrolment, and enrolment in post-secondary technical and career schools are shown in Tables 1 and 6 of chapters 1 and 2. While not all forms of formal schooling can be considered a perfect substitute for apprenticeship training, the relative magnitude of expansion of institutional forms of schooling and training is nevertheless instructive. For Canada as a whole throughout the sixties, different forms of schooling invariably increased by 200% to 300% while apprenticeship training only rose by 30%. Enrolment comparisons show two other interesting features: unlike to enrolment growth in formal schooling, which is stable, apprenticeship training displays substantial variability over the business cycle; secondly, those provinces and regions with less growth in post-secondary and secondary full-time vocational schooling show larger increases in apprenticeship training. Further evidence as to the importance of expanding vocational skills as opposed to expanding provincial systems of education, can also be gathered from an analysis of measures undertaken to train and upgrade vocational teachers under programme 7 of the TVTA Act. For, in some provinces, vocational teachers were trained and certified within the same teacher colleges or institutions which were in charge of the education of educators, while other provinces provided for programmes and institutions which were more closely tailored to the requirements of vocational teacher education. From a secular perspective, there was an overall decline in vocational teacher training over the period 1960-67.[18] Hence, despite the massive injections for vocational training through the TVTA Act, apprenticeship training remained a secondary source of skilled labour supply throughout the sixties. In part, at least until 1965, skilled worker immigration still occurred and was considered a cheaper source of skill supplies for most employers. This is also evident from 1971 Census data, which show an overrepresentation of immigrants in apprenticeable occupations in the sixties compared to the total labour force (Buckley and Nielsen, 1976). On the supply side, few incentives existed to increase enrolment in apprenticeship training for it was a period in which economic success was interpreted as almost exclusively the result of more schooling; a period in which massive educational expansion and upgrading occurred, fueled by the proponents of the "Human Capital Revolution."[19] The availability and subsidization of institutionalized forms of schooling and training, combined with euphoric expectations of high and rising rates of return from schooling, would have made decisions to enter an apprenticeship training programme almost irrational. Apprenticeship training once more was restricted to those who used it as a last resort after having failed in the school system and/or in the labour market.

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[18] Young and Machinski, op. cit., Table 10, p. 56.
Glendenning, op. cit., pp. 58, 59.

In recognition of the partial failure of TVTA to provide adequate skills and productivity for the Canadian economy, the federal government repealed the act and later extended it to March 31, 1970. In its place it put the Adult Occupational Training Act which became effective in May of the same year. Federal support for vocational high school programmes was terminated and instead, replaced by the development of post high school adult training and re-training. All training was to be short-term with limits placed at one year. Grants and cost-sharing agreements were substituted by a policy of purchasing training seats for particular target groups or fields of training. From an active manpower or labour market policy perspective, longer-term structural reforms in education and education-to-work linkages were given up in favour of more reactive and direct labour market interventions directed at those groups which revealed adjustment problems. Instead of correcting possible failures of the education system which was shown impossible on account of jurisdictional supremacy of the provinces, the federal government now undertook to provide a second layer of post-school human investments for those who had been out of school and in the labour force for over three years and needed basic skill development, upgrading of skills and education, apprenticeship training and, in the case of new immigrants, language training. By contracting out to those institutions which provided it and which were under provincial jurisdiction through more direct screening, counseling and placement of trainees in a newly developed network of manpower centers, the federal government hoped to exercise better control over manpower training activities.

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[19] In addition, wage differences between skilled and unskilled workers had narrowed throughout the sixties. See:

S.G. Peitchinis, "Occupational Wage Differentials in Canada 1939-65," Australian Economic Papers, June 1969, pp. 21-39.

The first test of AOTA's effectiveness came during the beginning of the seventies when a combination of high labour force growth and recessions both in 1971 and 1974, produced high rates of unemployment particularly among the youth labour force. The three-year labour force participation rule for qualification under OATA was quickly recognized as a major impediment and the Act was amended in 1971. Direct subsidies given by the federal government for the institutional portion of apprenticeship training, the provision of training allowances and the reduction of the three year labour force participation requirement to one year led to a gradual secular increase in apprenticeship registration and enrolment in the seventies as can be seen from Tables 1 and 2. In relative terms, it still, however, amounted to under one and a half a percent of the labour force aged 14-24 (Table 3).[20]

The reasons why apprenticeship training did not increase faster during the first part of the seventies were the still prevailing anti-apprenticeship attitudes on the part of a majority of federal and provincial authorities engaged in manpower and education, attempts by the more populated provinces to retain and utilize institutions of formal schooling and higher learning which had been built throughout the sixties and a still-growing service sector, for which few occupations were apprenticeable. How important institutional training was in this period relative to industrial and apprenticeship training can be further evaluated by comparing relative enrolments in either programmes under AOTA, e.g. CMTP and CMITP. Enrolment of industrial trainees was under 10% in 1970-71 and around 20% in 1974-75[21] hence, over 80% of all training consisted of academic upgrading and skill training of sorts in educational facilities of the provinces through the purchase of training seats by the federal government. As neither unemployment nor productivity performance improved appreciably throughout this period, a number of reports, including the governments own large evaluation in 1977,[22] began to question the relevance and efficiency of institutional manpower training. And as, for the first time, critical trade shortages developed during the latter part of the seventies, a process of re-thinking alternative strategies of manpower development began--a process in which we are still engaged today.[23] Industrial training in general and apprenticeship training in particular, are for the first time in history, being considered as equally important to industrial excellence and productivity as formal schooling and education. Lower rates of skilled worker immigration in the latter part of the seventies on account of unavailability from traditional European countries of emigration, increasing wages and wage differentials for highly skilled workers and declining enrolment in universities have provided additional market pressures for more industrial skill training such as apprenticeship training. Whether the federal government will rely on provincially-administered apprenticeship training to close the apparent skills gap or find alternative measures and mechanisms of manpower adjustment will depend, among other things, on its assessment of the responsiveness of apprenticeship training to federal leverage. This should require more than a mere counting of training seats purchased in the past or comparisons of enrolment in apprenticeship training relative to other training programmes. Rather it should be based on an investigation of the factors which, in the recent past, have determined both the quality and quantity of apprenticeship training. It is to this task that we turn in the next three chapters.

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[20] Note, however, the large variations across the provinces. From an international perspective, these rates are rather low. During 1970-75, comparable rates in Britain stood at 2% and in West-Germany at 4%.

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[21] Department of Manpower and Immigration, Annual Reports, 1971, 1975.

[22] Interdepartmental Evaluation Study, The Canada Manpower Training Programme (Ottawa: Program Evaluation Branch, Employment and Immigration Canada, 1977).

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[23] A direct result of this has been the initiation of a number of evaluative studies and task forces on human resources development and employment, for example:

Economic Council of Canada, Human Resources Survey (Ottawa: Queen's Printer, 1980).

Interparliamentary Task Force on Employment in the Eighties, Work for Tomorrow, Employment Opportunities for the '80s (Ottawa: House of Commons, 1981).

Department of Employment and Immigration, Labour Market Development in the 1980's (Ottawa: Queen's Printer, 1981).

Table I

Historical Review of Enrolment and Funding Statistics in Apprenticeship, 1944 - 1980

Year	Enrolment	Number of Registered Apprentices at the End of Fiscal Year[2]	Federal Expenditures in dollars[2]	Federal Expenditure Allotments in dollars[2]
1944-45	412		6,474.75	
1945-46	2,812		43,053.31	
1946-47	3,441	4,905	119,745.43	140,500
1947-48	3,625	10,212	112,650.61	210,000
1948-49	4,986	11,902	254,758.12	278,000
1949-50	4,845	10,976	399,124.71	410,000
1950-51	5,286	10,141	427,387.12	480,000
1951-52	5,829	10,850	493,954.18	480,000
1952-53	6,973	11,001	774,421.02	490,000
1953-54	7,867	11,746	753,157.89	847,100
1954-55	8,611	12,902	838,858.17	793,500
1955-56	9,297	14,023	891,198.40	894,500
1956-57	9,928	15,364	1,033,979.39	972,600
1957-58	12,928	16,662	1,331,747.59	1,157,300
1958-59	14,729	17,288	1,674,591.44	1,554,500
1959-60	13,426	18,591	1,790,496.80	1,641,900

Table 1 - continued:

Year	New Apprenticeship Registrations[3]	Number of Registered Apprentices at the End of Fiscal Year[3]	Expenditures on Apprenticeship[4] in $000
1960-61	7,375	19,543	4,815
1961-62	7,748	19,947	5,303
1962-63	8,239	20,526	5,497
1963-64	10,046	21,193	7,263
1964-65	12,461	23,694	6,652
1965-66	15,556	28,511	9,578
1966-67	17,190	33,614	9,608
1967-68	14,991	39,114	12,099
1968-69	18,423	40,925	20,507
1969-70	15,850	44,416	22,259
1970-71	10,014	45,280	24,165
1971-72	13,558	45,628	25,982
1972-73	21,847	46,530	28,593
1973-74	24,535	47,116	23,986
1974-75	28,625	57,386	46,816
1975-76	28,722	67,012	49,437
1976-77	27,655	74,129	26,080
1977-78	31,831	96,835	17,390
1978-79	37,424	102,778	10,162
1979-80	35,398	104,093	19,193
1980-81	39,697	113,408	n.a.

Data Sources:

1. Data from Machinski and Young, A historical survey of vocational education in Canada (Ottawa: Canadian Vocational Association), 1973, Table 6, p. 30.
2. Labor Canada, Annual Reports.
3. Statistics Canada, Survey of vocational education and training, Cat. 81-209 and 81-238, for later years 1975-81, unpublished, Statistics Training Branch, Employment and Immigration.
4. Statistics Canada, Financial Statistics of Education, Cat. 81-208.

n.a. - not available

Table 2

New Registrations of Indentured Apprentices in Skilled Trades - Canada & the Provinces

Year	Nfld	PEI	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Yuk	NWT	Canada
1960/61	374	-	442	510	n/a	2,450	598	485	1,847	669	-	-	7,375
1965/66	652	44	834	1,100	n/a	5,571	491	1,096	3,067	2,677	-	-	15,556
1970/71	232	39	924	368	n/a	4,012	461	481	1,515	1,954	3	25	10,044
1974/75	977	159	1,760	1,821	235	9,556	999	1,230	5,398	6,550	8	167	28,860
1978/79	870	192	1,606	1,437	3,907	11,139	1,048	1,336	8,724	6,970	38	157	37,424
1979/80	871	109	1,308	1,208	4,674	10,576	1,096	1,735	10,518	7,801	62	114	40.072

Source: Survey of Vocational Education and Training, Stats. Canada, 81-209

Data for the province of Quebec from 71/72 to 79/80 provided by the Ministry of Labour of the Quebec Government.

n/a = not available

Table 3

New Registrations of Indentured Apprentices in Skilled Trades as a Percentage of the Labour Force

Year	Nfld	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Canada Total	Canada Age 14-24
1960/61	0.23				n/a	0.10	0.25			0.11	0.11	0.51
1965/66	0.48	0.12	0.34	0.54	n/a	0.21	0.14	0.33	0.55	0.38	0.21	0.87
1970/71	0.15	0.10	0.35	0.17	n/a	0.12	0.12	0.14	0.23	0.22	0.12	0.45
1974/75	0.50	0.36	0.58	0.70	0.15	0.25	0.23	0.32	0.69	0.58	0.29	0.59
1979/80	0.41	0.20	0.36	0.42	0.16	0.24	0.22	0.39	0.99	0.61	0.35	1.31[1]

Source: Table and Labour Force Data from Stat. Canada, 71.001 and Historical Labour Force Statistics, Stat. Canada, 71.201

Note: Registrations are expressed as a percentage of the labour force in May of the following year, e.g. 79/80 registration as percentage of labour force in May 1980.

[1] Age group 15-24 is used.

CHAPTER II

The Nature of Apprenticeship Training in Canada

Canadian provinces have evolved different methods of skill acquisition, on account of varying patterns of immigration, stages of industrial development, educational development and philosophies, patterns of industrialization and government support programmes. Consequently, we find extreme variability with regard to the extent of apprenticeship training, its qualitative (e.g. curricular) nature and the way in which apprenticeship training schemes are introduced and administered in the various provinces. This chapter analyzes the main qualitative features of apprenticeship such as the number and type of apprenticeable occupations, the legal and administrative structures of provincial apprenticeship training systems, the structure and content of apprenticeship training and procedures, and criteria for admission to apprenticeship training. The content of this chapter draws heavily on existing and documented provincial legislation on apprenticeship training, various national and provincial Task Force reports on training, information from extensive interviews which the author conducted with provincial apprenticeship training branches, and the comparative material assembled by the Interprovincial Standards Program Coordinating Committee of the Department of Employment and Immigration, called the "Ellis Chart."[1] The latter provides a useful point of departure to describe the variability of apprenticeship training in the context of different provincial jurisdictions and regional diversification.

As of 1980, the Ellis Chart of which key indicators have been reproduced in Table 4 lists 153 different Canadian apprenticeship training programmes leading to over 153 different skills and/or trades. However, of those, 101 apprenticeship training programmes are offered only in one or two provinces, with the remaining 52 being provided in at least three provincial jurisdictions. Only 11 apprenticeship training programmes, which are mainly concentrated in the construction trades, are at the present time offered throughout Canada. Upon further analyzing the characteristics of apprenticeship training in a given trade across the provinces with respect to legal provisions, administration and curriculum, one notices a large interprovincial variation in any one of these dimensions. Educational requirements for entry into apprenticeship may vary by as much as three years within a given trade. The lengths of apprenticeship training programmes may vary by as much as one year of training and there is also considerable variation in the split between on and off-the-job training and the ways in which the institutional portion of the training is carried out (e.g. modular versus block-release method).

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[1] Interprovinical Standards Program Coordinating Committee, Ellis Comparative Chart of Apprenticeship Training Programmes, 1980 (Ottawa: Employment and Immigration, 1981).

Similar variations can be found with regard to the licencing and/or regulating of apprenticeship training. Most of these interprovincial differences have evolved from institutional arrangements, that in turn reflect differences in educational philosophies, in the economic interests of labour market participants, and/or the political pressures inherent in designating trades and administering and running apprenticeship training schemes. Below, we attempt to provide a brief overview of the legal framework and administrative structures governing apprenticeship training in Canada's ten provinces and two territories.

1) Legislative Provisions

The basis for the scope and organization of provincial Apprentice Training in all provinces and territories is determined by provincial legislation normally referred to as "The Apprenticeship and Tradesman's Qualification Act"[2] and its amendments, which have been provincially enacted at various points in time throughout the post-war period. The act invariably specifies trades which have been designated for apprenticeship training, the processes by which more occupations and trades become designated, methods of indenturing apprentices and specific regulations regarding curriculum, accreditation and certification for particular trades.

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[2] Alberta is a notable exception in this regard in that all legislation pertaining to apprenticeship is included and dealt with under the broader legal umbrella of the Manpower Development Act, 1976.

The most obvious and direct economic effect of apprenticeship legislation stems from alternate forms of occupational regulation. Consequently, much of our subsequent analysis of legislation will deal with the economic impact of regulation and its inter-trade and interprovincial variations. In addition, we will discuss legislation with respect to the administrative structure for apprenticeship training in terms of its jurisdictional location and the size and organisation of governing and advisory agencies.

Administrative Structures and the Process of Trade Designation

Throughout Canada there is great similarity and uniformity in the basic organizational structure for carrying out the mandates of the Apprenticeship Training Act, in that we find:

a) a provincial apprenticeship training board[3] as the major policy-making and governing body of apprenticeship training with regard to such matters as recommendations on the designation, curriculum requirements, and regulatory aspects of trades.

b) provincial advisory committee(s) for particular trades or groups of trades which assist and advise the training board in the formation of policy.

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[3] With the exception of the province of Ontario, where policy making emanates directly from the Apprenticeship Branch situated within the Ministry of Colleges and Universities.

c) an apprenticeship training and tradesmen qualification board or department as the major administrative unit organizing and carrying out apprenticeship training according to the respective provincial regulations. This branch can be located either in the provincial Department of Labour, Manpower, Education or a combined Ministry of Education and Manpower.

d) local advisory committees grouped around the major provincial urban centres which are to inform and advise the provincial aprpenticeship training branch and/or provincial advisory committees concerning specific local problems such as shortages of skilled workers, critical numbers of laid-off apprentices, complaints with respect to the execution of training by local employers, schools, etc. Not all provinces employ such local advisory committees.

If the output of provincial apprenticeship systems varies despite the aforementioned, similarities in organizational design and administrative structures of provincial apprenticeship authorities, it is usually because of the varying composition of these bodies, the leadership capabilities of their members, and differences in bureaucratic and managerial processes. For example, while most provinces have equal representation of management and unions on apprenticeship boards, trade advisory and local advisory committees, we can observe a much greater variation in the representation of vocational education and government on any of these organizational entities. Apart from aspects such as sector representation, the work and output of any of these committees is equally influenced by the actual selection of particular individuals for committee work and the internal administrative rules of these committees. Hence, even though provincial governments may often be under-represented (in terms of numbers) on any of the decision-making and advisory committees, they can, and often do, exert considerable leadership by:

a) choosing those respresentatives who are likely to support provincial philosophies and/or policies of apprenticeship training.

b) serving in the capacity of chairmen on these committees, and

c) determining agenda of meetings and/or administrative rules within these bodies.

As a consequence, in many provinces the development and proliferation of apprenticeship training has been largely determined by the general educational philosophies and the prevailing understanding and perceptions of labour market needs as viewed by provincial bureaucracies. At the same time, it is possible that representatives of industry or from the unions exert leadership and, hence, decisively influence the creation and development of apprenticeship training in a particular trade or group of trades. If there is any general rule that could be applied in order to explain the political process inherent in these administrative structures, it would have to center around the economics of political participation.[4] According to the latter, participation can be expected to be both more pronounced and more effective where the stakes in terms of opportunity costs and gains are relatively high. This explains, for example, the much more articulate and effective representation of craft unions relative to industrial unions on any of the aforementioned provincial or local advisory committees where the latter often only serve a watch-dog function. Similarly, where the majority of employers in a given industry expect little gain from participation, either because of ignorance of the advantages of apprenticeship training, because of accustomed use of cheaper means of skill acquisition such as immigration or formal schooling, or because of heightened costs and risks of training, we are likely to find a low interest in participation. Everything else being held constant, we would, therefore also expect different employer attitudes in matters of participation and business/government co-operation in the field of apprenticeship training in those provinces which historically have received less skilled immigrant workers such as has been true of Alberta compared to e.g. Ontario or Quebec.

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[4] For a theoretical treatment, see:

G. Stigler, "The Theory of Economic Regulation," The Bell Journal of Economics and Management Science, Vol. 2, No. 1, Spring, 1971, pp. 3-21.

The nature of the administrative process can be further illustrated in the context of the designation of a new trade. Initiatives for the development of a new trade and apprenticeship training programme can originate either outside the provincial apprenticeship training authorities through petitions from employers, employer associations, or unions. Depending on the province in question, these petitions are then handled through an order in council, a ministerial request, or direct applications to the apprenticeship board.

The most difficult task for all provincial apprenticeship training authorities is to assess the legitimacy and rationality of such requests in the context of the longer-term occupational demands of the province and the opportunities, constraints and alternatives of the vocational education system. Again, great interprovincial variations in the thoroughness and choice of instruments appear to exist within this decision-making process. In some provinces, requests are mainly vetted within the previously described framework of apprenticeship training boards and advisory committees, sometimes aided by special surveys of industry or other investigations. Some provinces seek information and advice from provincial-federal manpower needs committees. The need for advice has led to the establishment in some provinces of long-term manpower forecasting entities both within and outside provincial departments of labour or education.

Alternatively, initiatives can be developed from within provincial apprenticeship training authorities such as the apprenticeship training branch. This approach is found in those provinces where most of the leadership and execution of apprenticeship training lies in the hands of the apprenticeship branch.

Despite observable provincial variations in the vigour of assessing longer-term training needs and their consequential effects upon the development of apprenticeship training initiatives, all provincial experts seem to agree that the existing administrative instruments are less than satisfactory in providing a sound, logically clear approach to the designation of new trades.[5] The following is a brief list of problems frequently encountered.[6]

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[5] Much the same can be said for the modification of existing apprenticeship training programmes.

[6] Based on interviews with provincial apprenticeship training officials. Similar observations have been recorded in:

Johan Schuyff, "Industrial Training in Canada: Some Observations," Labour Research Bulletin (British Columbia: Department of Labour, pp. 22-28).

1) To the extent that employers in decentralized industries are either not interested in training, or assume that somebody else would carry out training for them (e.g. education systems or immigration), involvement and participation of industry may not provide the appropriate answer. The fact that there are fewer apprenticeable occupations in Canada in comparison to other industrial countries may, therefore, be as much a lack of appreciation on the part of the private sector as it is the result of inadequate apprenticeship policies.

2) Existing administrative structures are far too vulnerable to political pressures exerted by a multitude of local and often narrow-interest groups. In order to maintain co-operation and/or a low cost concensus, there is a tendency for concensus policies of lease resistance to be maintained or enacted. The latter implies for example, that a new trade or the splitting of an old trade into two new ones may easily be resisted by representatives on the board such as unions, management and/or other involved parties. For example, in Saskatchewan, the mining association wanted and supported the designation of two separate trades--construction electrician and industrial electrician--and was opposed by both the

unions and the contractors. In the same province, recently, attempts were made to establish the trade of "sprinkler and home protection equipment installer" with the support of both the plumbers and pipefitter's unions. The attempts were fruitless because of opposition from the conctractor's association. Similar experience in other trades can be found in all other provinces.

3) Associated with such problems of politics in the designation of trades is an observable unevenness in the quality and intensity of private and public sector participation in the administrative process. There are provincial boards, as well as provincial local advisory committees which meet often and regularly and which are composed of individuals who are very knowledgeable in the field of apprenticeship training.

However, we can also find advisory committees where it has been difficult to appoint the appropriate union and employer representatives, where the process is dominated by a particular individual and/or point of view and where the overall work is much more sporadic and far less effective.

4) Rapid changes in technology and industrial organization, along with major realignments in trades, require a certain amount of innovation and forward-looking perspectives in training. But this must be balanced against the need in other sectors for stability in existing apprenticeship training schemes and programmes Hence, once again, the problem of adequate representation of varying interest groups and their particular needs is further complicated. This lack of adequate representation has produced a current situation in which many trades are too rigidly defined while others have remained undefined.

5) To the extent that initiatives and leadership are developed within provincial governments, other constraints have appeared which are often considered binding by those administering apprenticeship training. Among these are considerations to secure federal subsidies, existing provincial capacity constraints on the schooling portion of apprenticeship training, and staffing constraints within branches. For example, staffing constraints may lead to a priorizing of new initiatives in trade designations around existing staff expertise. The lack of initiatives in many service sector occupations, particularly sales and artistic occupations, is not only attributable to an over-zealous expansion of college

education and other government training programmes, but also due to the lack of expertise and interest within provincial apprenticeship training systems. Easy federal money available under both the CMITP and CTSP programmes and administered under the Adult Occupational Training Act, has, in some instances, priorized provincial training according to federal incentives even though market priorities may vary across time and provincial jurisdictions. This is particularly noteworthy in the poorer provinces.

While all provincial apprenticeship training systems share some of these organizational and structural problems with respect to the development of apprenticeship training, some provinces have obviously fared better than others. Generally speaking, initiatives from both provincial governments and the private sector were stronger, better organized and longer term oriented, where neither the existing educational system nor immigration could be used as quick, easy and short term substitutes for apprenticeship training. This was evidently true for most western provinces, notably Alberta, Saskatchewan and Manitoba, and reflected in the relative expansion of registered apprentices as a percentage of the provincial labour forces (see Table 3).

The Regulation of Trades Apprentice Training

At present, three major areas of apprenticeship training are regulated and enforced with varying degrees of rigour across different jurisdictions and trades. They are:

a) regulation of entry into apprenticeship through admission criteria,

b) regulation of structure and content of training through prescribed curricula and,

c) regulations pertaining to examinations and certification of training.

The varying nature and degree of regulation can partly be identified by the specification and nomenclature of apprenticeship training under provincial Apprenticeship and Tradesman's Qualification Acts. These distinguish, for example between registered and non-registered, regulated and voluntary apprenticeship training, and apprenticeship training without compulsory certification versus licenced apprenticeship training requiring compulsory certification (see also Table 4). Non-registered apprenticeship training is not covered by provincial legislation. It essentially represents company-run apprenticeship training programmes whose training schedules and standards of examination are set and entirely controlled by the employer. By residual, all apprenticeship training covered by provincial legislation represents registered apprenticeship training. Registration implies that the provincial government, through the apprenticeship training branch or its equivalent, provides a framework of training through curricula and examinations, and, at the same time, specifies entry requirements into apprenticeship.

In the case of regulated trades, training schedules, and exams, minimum wage rates for apprentices, and often also the maximum number of apprentices per training journeymen are strictly prescribed in terms of fixed standards. In the case of voluntary or non-regulated trades, which exist predominantly in secondary manufacturing occupations, such standards are absent and these trades are often not precisely defined. Similarly, there is no specific description of standards of training and little definition of requirements for final and interim examinations. Regulated trades can be further differentiated into those with compulsory certification, which essentially constitutes licensing, and those with no compulsory certification, implying that an individual can begin and carry out work as a qualified journeyman without having a certificate of qualification.

Graduation from an apprenticeship training can, therefore, produce a certificate of apprenticeship (observed in most voluntary programmes) and a voluntary or compulsory certificate of qualification (as can be found in most regulated apprenticeship training programmes).

Regulation of Entry Requirements

Throughout Canada we find entry requirements which are somewhat interrelated and which have become subject to provincial regulations, e.g. age, minimum education and admission or entrance tests.[7]

Similar to the process of designating a new trade, entry regulations are the result of and reflect the views and philosophies of those who determine apprenticeship training within the administration structures explained previously. As opposed to other industrial countries where concern about the maximum age is more pronounced legislative provisions in Canada call for a minimum age of sixteen, with no upper limit. Successful secondary school students would therefore normally enter apprenticeship training after having completed grade 10. This in turn explains the relative frequency of Grade 10 as an educational prerequisite for most apprenticeship training programmes in most provinces. There is nevertheless substantial variation of these prerequisites both within trades across provinces, and across trades. Variations in educational prerequisites can be rationalized on at least four counts:

1) to the extent that fully-trained journeymen experience substantial post-training upward mobility into supervisory

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[7] The latter are a unique feature of apprenticeship in Alberta. For international comparisons of entry requirements into apprenticeship, see:

OECD, Policies for Apprenticeship (Paris: 1979), pp. 33ff.

positions, higher levels of general schooling prior to specialized trades training may be required.[8] Since some apprenticeable occupations provide more career mobility than others, we should consequently observe some variations in education entry requirements.

2) The level of general schooling required for a particular apprenticeship training programme is a function of the quality of post-secondary and vocational education. Where provincial secondary education is of lower quality and/or prepares students later in basic mathematical, communications and analytical skills, higher grade levels will be necessary as minimum general educational preparation. Similarly, to the extent that the in-school part of the apprenticeship training or system provides insufficient necessary theoretical instruction for trades training, then educational shortfalls would have to made up through higher general education entrance requirements into apprenticeship training. There exist, no doubt, great variations in the quality of both general and vocational education throughout

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[8] Indeed, this is the reason most frequently cited by companies for only hiring Grade 12 students into their company apprenticeship training programmes, for reference, see for example:

Dofasco, Brief Presented to the Parliamentary Task Force on Employment in the Eighties.

the provinces of Canada. The fact that high school completion can range from Grade 11 in Newfoundland to Grade 13 in Ontario, alone attests to this.[9]

3) A higher level of general schooling may be necessary for specific skills or trades, e.g. many of the new apprenticeable occupations in electronics and electrical work may require completion of Grade 12 or equivalent because of the complexity of the subject and the nature of the technology involved.

4) The setting of educational entry requirements is heavily influenced by the decision-making process within the apprenticeship training system and as such may possibly reflect the views and interests of particular groups such as unions, employers, educationalists or other provincial representatives involved in the process. For example, many of the more unionized occupations seem to require higher levels of minimum education and/or require entrance tests; similarly, employers can call for unrealistically high levels of general education in the designation of new trades.[10]

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[9] For a similar view, see OECD, Apprenticeship....op. cit.

[10] An example which comes to mind and which was communicated to the author was the case of an employer group in Western Canada which insisted on a Grade 12 prerequisite for an apprenticeship training programme for farm equipment mechanics.

Since inter-provincial and international comparisons of entry requirements show appreciable flexibility with regard to both age and education, one might question whether in some provinces educational requirements have been set too high. Social cost arguments can be made both for and against requiring apprentices to have high levels of general education. If set too high, e.g. Grade 12, general education prerequisites could exclude from apprenticeship training a large segment of marginal academic, but possibly good vocational, students. Among these would be high-school dropouts, immigrants lacking educational credentials or with language difficulties, and Metis or other Canadian natives. The social costs of educational entry restrictions could be measured as employment and income effects for these groups. On the other hand, low levels of general schooling may restrict the post-apprenticeship upward mobility of fully skilled workers. In the absence of empirical research on optimal levels of general schooling for particular apprenticeable occupations and their associated career patterns in Canada, it is impossible to infer the social costs of alternative educational entry requirements. About the most that can be said is that, an efficient apprenticeship training system should be one which provides flexibility of entry regulations so that lack of schooling credentials can easily be made up and/or entrance tests can be substituted for missing educational attainment. Most provinces provide for some flexibility in educational prerequisites, either through an appeal mechanism or provisions which allow the director of the apprenticeship training branch to grant exception. The Alberta system has probably developed the most flexible approach by making entrance exams a substitute for general schooling credentials.

Apart from foreign experience, some limited evidence as to whether educational standards are geared to the individual educational background of apprentices and occupational requirements can be gathered from the distribution of educational attainment among apprentices registered during 1979 in Alberta and contained in a special tabulation of the Alberta apprenticeship training branch.[11] The data show that among the 36 designated trades on average 40% of the apprentices exactly met the prescribed entrance requirements, 15% had less than the prescribed minimum and the remaining 45% had attained more schooling than required by regulations. The last group, however, contains an undisclosed number of graduates from composite high schools, who under the Alberta system are given credit during apprenticeship for industrial education taken previously. The latter would suggest that there is much less over-education than the 40% reported above.

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[11] Alberta Apprenticeship Training Branch, Special Tabulation: Educational Background by Trade, Unpublished (Edmonton: 1980).

When viewed in the context of strong interprovincial variations in educational requirements for apprenticeship training, this again raises the question of the validity of such educational requirements. Since the province of Alberta reportedly trains for higher levels of proficiency in comparison to other provinces[12] while showing, at the same time, greater flexibility in the handling of admission criteria and granting of school credits, one must conclude that some provinces probably have, in the past, been engaged in some form of "educational credentialism."

Given the existence of quality variations throughout and within provincial systems of secondary education, a more objective and, hence, rational approach towards the setting of entrance examinations would be to standardize requirements for different training programmes in terms of specific minimum skills and/or qualifications to be tested through entrance examinations.

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[12] Statement based on interviews with a number of apprenticeship training experts in the field.

Regulation of Structure and Content of Apprenticeship Training

Apprenticeship training which is registered with provincial apprenticeship boards, is subject to specific regulations regarding its amount, type, sequencing and the total number of years required for completion of apprenticeship training. Again, we can observe considerable variations across provinces. For example, it takes four years to become a boiler maker in New Brunswick or British Columbia and, in either province, apprentices are required to take four weeks of in-school training per year in the form of a block release. In Ontario, Alberta and Newfoundland, the required length of apprenticeship is only three years with in-school block release training amounting to eight weeks in each period. All other provinces have a three year programme for boiler makers with six weeks of in-school training in each apprenticeship training period. Further differences can exist with regard to the licensing approach and the form of testing for particular sets of skills or skill clusters within the overall apprenticeship programme.

Of particular relevance in this context are innovations in training methods such as the modular approach or "training by stages" and the evaluation of training and/or trainee success through on-the-job check-offs or ratings using competency-based models. Such approaches stand in contrast to the more traditional "straight-through" training system with a heavier reliance on written tests. There appears to be little disagreement among vocational training experts, or for that matter anybody involved in training, that good quality training ought to be based on specific training goals, best expressed in terms of specific levels of skill proficiency or competency, and achieved more effectively through performance based instruction. There is, however, considerable disagreement as to whether or not modularizing the system of apprenticeship training would bring all of these advantages without any negative consequences.[13] At this point, a brief discussions of skill specialization in the context of prevailing industrial relations environments is in order.

Modularization and Specialization in Skill Training Versus General Skill Training: An Industrial Relations Perspective

Modularized training breaks the total training programme into self-contained stages or modules which form independent units of instruction, e.g. one module in the tool-making trade might instruct an apprentice in the operation of a particular type of machine, another module might provide instruction on the repair of that machine. Trainees could, and would, be examined and accredited on a module by module basis, thus providing more flexibility for employees and trainees in developing individual training programmes to suit unique needs. From the point of view of total programme efficiencies, it appears though that the whole issue of specialization and compartmentalization of trade skills and its accommodation through modularized training ought to be viewed in the context of the wider issues of short- versus long-term social costs/benefits associated with specialization and its prior conditioning through our existing system of industrial relations. It seems that modular training and specialization require a balancing of social short-term and long-term gains which can only be achieved in an overall environment of enlightened management[14] and existence of cooperation on the part of unions, both of which in turn render government intervention unnecessary. The latter scenario somewhat describes the training environment found in larger Japanese firms where training is less formal and more specialized (and in that sense modularized). In such an environment workers can, over their working lives, reasonably expect to receive all necessary modules of training comensurate with their skill endownments and the general pattern of employment growth of the firm. Given the long-term nature of the employment relationship, the existence of flexible internal labour market structures, and the existence of autonomous work groups embedded in a social environment of mutual trust between workers and management, this system of training has worked extremely well for Japan. Not surprisingly, it has become the marvel of social scientists engaged in industrial relations and industrial sociology.[15] It is, however, highly questionable whether skill specialization and skill compartmentalization could occur in a similar environment of industrial relations in Canada. On the contrary, there is ample evidence to suggest that the latter is characterized by a higher degree of mistrust between management and labour which, when related to questions of worker skills and worker quality, translates into a labour management environment of strategic and opportunistic posturing by both parties. Consequently, management is seen to have an interest in skill specialization not only for the sake of productivity but also for reasons of reducing dependency on workers thereby increasing monopsony and, hence, bargaining power. Unions traditionally have pressed for general skills and general training in order to enhance their own strategic positions.[16]

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[13] For some discussion on modular training, see:

Ontario Ministry of Colleges and Universities, The Future of Apprenticeship, Report of a Symposium (Toronto: September 1977).

______, Employer Centered Training Project: Training Approach, Unpublished manuscript (Toronto: 1978).

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[14] Englightened management can be institutionally determined such as is the case in Japan, where labour is considered a fixed factor of production or it can be inspired by varying philosophies and convictions of management, viewing human investment from both short- and long-term perspectives, itself a function of company experience and history.

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[15] For the most recent account in an otherwise mushrooming literature on Japanese industrial relations, see:

W. Ouchi, Theory Z. How American Business Can Meet the Japanese Challenge (London: Addision-Wesley, 1981) or

J. Abegglen, Management and Worker: The Japanese Solution (Tokyo: Sophia University, 1973).

Pursuing this line of reasoning, one might indeed argue that existing levels of skill specialization and their subsequent and necessary coordination and control at the work place in Canadian industry reflect and represent higher levels and associated social costs of mistrust[17] and may, therefore, not be the result of a simple calculus based on varying factor prices and labour substitution as viewed by many neo-classical economists.[18] Put differently, industry may desire narrow skill specialization and be willing to accept the higher costs of coordination and managerial controls as well as poor quality and craftsmanship[19] when faced with the alternatives of heightened bargaining strength and increased wages for workers through the creation of more general skills.

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[16] For a general treatise of industrial relations and the role of worker skills, see:

John T. Dunlop, Industrial Relations Systems (New York: Holt, 1958).

For an anlytical model of management/worker conflicts over skill specifity, see also:

James Scoville, "A Theory of Job and Training," Industrial Relations, Vol. 9, 1969, pp. 36-53.

[17] For an excellent treatment on the evolution of the employment relationship and the economics of cooperation and trust, see:

A. Fox, Beyond Contract: Work, Power and Trust Relations (London: Faber and Faber Ltd., 1974).

Another argument against the specialization of skills and training towards more narrow product-, job-, firm- or industry-specific content is given by employers' observed lack of commitment to retrain manpower (e.g. to offer subsequent "stages" or "modules" of training) in the face of technological change.[20] Since it is often cheaper to recruit workers who possess specific skills associated with a particular "training module" than to train existing employees, firms would lay-off workers with outdated or inappropriate skills when faced with changes in present demand and/or technology, and replace them with workers who command the required new skills and training. In turn, this will further raise labour market imbalances in the form of frictional and technological unemployment leading to more labour market intervention such as government sponsored manpower training and retraining programmes. The present simultaneous existence of shortages and unemployment within certain metal machining trades or the fact that millwrights are presently laid-off in the automotive industry and cannot find employment in the expanding aircraft industry, amply demonstrates the negative long-term effects of narrow skill training. Modularization would amplify this effect, even though it may provide efficiencies in the production function of training.[21] On account of the latter, it may still be worthwhile pursuing, provided trainees and employers are prevented from opting out of the total package of modules. If accreditation were only given to the completion of all modules contained in a particular apprenticeship training programme analogous to education processes in formal schooling increases in teaching efficiency may be preserved while securing at the same time the formation of general transferable human capital.

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[18] This argument is of equal importance in the context of occupational regulation.

[19] We refer in this context to the large and persisting differences in product rejection rates between Japanese and Canadian plants, e.g. in automobile or electronics industries.

[20] This, no doubt, is again a function of our existing industrial relations climate.

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[21] However, some provinces have achieved rather dubious long-term effects with curricular experimentation in formal schooling along similar lines of modularization. A careful evaluation of training efficiencies with respect to the overall skills competence including all modules may, therefore, be called for. For a critical review of Canadian education, see also:

OECD, Review of National Policies for Education, Canada (Paris: OECD, 1976).

To summarize modularization of apprenticeship training provides a number of efficiencies associated with an improved matching of qualifications and training to existing specific tasks of production, however, it also raises questions regarding its long-term efficiencies which it was argued cannot be obtained in a general industrial relations atmosphere of antagonism, mutual distrust and monopsonistic bargaining.

While discussions about modularization of apprenticeship training presently appear as the more popular ones among training experts, they, by no means exhaust all determinants in the efficiency of off- and on-the-job training and its variability across provinces and trades. Probably of far greater importance is the question of the optimal length of apprenticeship training, the appropriate split between the off- and on-the-job training component, and questions as to how much credit ought to be given for relevant previous work experience and pre-apprentice vocational schooling. Not only are these questions interrelated but they in turn depend very much on apprentices' levels of productivity and wages during training.

Most provincial apprenticeship training systems recognize the need to give training and work time credits for relevant training received prior to entering apprenticeship.[22] As a general observation, most provincial systems display one or a combination of the following characteristics:

a) Given the great variability both in quality and availability of vocational schooling within and across provinces, and the mobility of apprentices, regulations of credits are rather flexible. In most cases only a general frame of reference is set out with specific credits to be negotiated individually between the apprenticeship training director, the employer and the apprentice.

b) In most provinces, the employer has to agree to the amount of credit given for previous training and/or employment.

c) With the exception of Alberta and New Brunswick, educational credits are given predominantly for pre-employment courses in collegiates or similar post-secondary institutions. Trades with strong unions and relatively high entry requirements appear to show less generosity with credits.

d) No province has ever undertaken an investigation into the relationships between educational credits and their effects on entry into apprenticeship on the one hand and the total package of credits and off-the-job training on apprentices' productivity and skill competence on the other hand. Just as is true for formal education, performance evaluation of apprenticeship training has, in the past, been heavily oriented towards measuring inputs and input variations.

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[22] For a description of provincial apprenticeship credit systems, see:

Ellis Chart, pp. 68ff.

Questions of worth and validity of high school courses and pre-employment training for apprentices take on further significance if they are considered within the context of the total length of apprenticeship and the total amount of institutional training provided.[23] In the absence of any hard evidence as to the productivity characteristics of alternative splits between off- and on-the-job training, alternative length of apprenticeship and differences with respect to allowable credits or carry over from other training programmes, provinces have come to rely very heavily on the same consultative mechanism which is responsible for the designation of trades and the introduction of apprenticeship regulations. That is, such questions tend to be dealt with by the advisory committees and Apprenticeship Sub-Committees which have become involved to varying degrees in curriculum development and the supervision of curricular matters.

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[23] Depending on provincial jurisdiction and the trade under question, off-the-job (institutional) training can vary between 10% and 20% of total length of training time.

Given the normal composition of such committees (unions, employers, representatives from education and provincial governments) this process too, becomes susceptible to partisan influences and is heavily dependent on the quality and leadership capabilities of individuals or groups. In recognition of the inherent weaknesses in this process and the lack of hard evaluation data, some provinces have started to conduct surveys on both the efficiency and outcome of apprenticeship training.[24] On the basis of both results from these surveys and interviews with apprenticeship training personnel, unions and management representatives, the following observations emerge with respect to the regulation of training quality and curriculum development:

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[24] See, for example:

Manitoba Dept. of Labour and Manpower, Research Branch, Apprenticeship Training Follow-up Survey of 1978-79 Apprentices, Unpublished results (Winnipeg: 1980).

Saskatchewan Dept. of Labour, Report of the Apprenticeship Review Committee, Unpublished manuscript (Regina: September 1980).

Ontario Ministry of Colleges and Universities, Survey of Employer Sponsored Training in Ontario (Toronto: 1980), and

_________, Results of a Study of the Costs and Benefits to Employers of Apprenticeship in the Province of Ontario, Unpublished (Toronto: 1980).

_________, A Study of Attitudes and Levels of Information Relating to the Apprenticeship System, unpublished interview results (Toronto: 1976).

Since length of apprenticeship is a function of trainee selection and training quality, there can be both potential and actual variation in the duration of apprenticeship. Where apprentices have less pre-apprenticeship vocational preparation, which is largely determined by its availability in provincial systems of secondary and post-secondary education, apprenticeship training tends to be longer. Where training costs and apprentice wages during the last year of apprenticeship are high, employers will attempt to recoup costs by either lowering training quality (e.g., actual on-the-job training time) and/or by keeping the period of apprenticeship as long as possible. Hence, under these circumstances too much emphasis is placed on "serving time" on-the-job as opposed to learning on-the-job.

As far as the quality of the on-the-job training component is concerned, most provincial apprenticeship training boards appear to be fairly critical about the quality of training provided by employers, listing, among others, such factors as absence of well defined plans for the training and supervision of apprentices, lack of pedagogical skills among journeymen (vocational teachers), and/or lack of appropriate machinery and equipment to expose the apprentices to all aspects of the trade. Such comments are fairly standard and could have come equally well from a governmental assessment of apprenticeship training in jurisdictions normally praised for their excellence in apprenticeship training, such as West-Germany.[25] What is far more illuminating is the variety of approaches taken by different provincial governments in order to overcome deficiencies in training quality. Strategies here center around reforms in the design of training and in the coordination of training decisions. With respect to the latter, coordination can range from legislative action combined with active enforcement to mere moral suasion; the actual approach taken appears to be very much a function of provincial governments' beliefs, perceptions, philosophies and ideologies with respect to regulation and market efficiency. Three distinct modes of coordination can be detected:

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[25] Reformen der Berufsausbildung, Aktuelle Programme und Initiativen von Bundesregierung, Parteien, Sozialpartnern und Wissenschaftlem (Berlin: de Gruyter, 1974).

a) An approach of minimum interference combined with incentives. Philosophies and perceptions underlying this approach assume that the employment relationship either does not contain conflicts between management and labour over issues of training, or that such conflicts should not be brought into the open. Accordingly, it is thought that firms will provide good quality training and labour will cooperate provided that organizations have good and low cost access to training resources and that individuals and firms are well-informed about training options and training efficiencies. In this mode, emphasis is put on moral suasion, extensive coaching of firms in terms of training design, planning and forecasting of manpower. Financial incentives are given in order to increase "enlightened management and unions." Large portions of apprenticeship training remain voluntary and are controlled by private sector interests.

b) Strict regulation of apprenticeship training through both compulsory training and compulsory certification. Here, it is assumed that firms would not engage in training and if they were to provide it, would only supply firm-specific training of lower quality for reasons of market failure. Licensing of occupations through provincial apprenticeship boards and enforcement through controls combined with heavy-handed regulations and prescriptions of training content mainly for the off-the-job part of training, are here seen as the most effective way to promote apprenticeship training.

c) An intermediate approach of training coordination with regulatory guidelines carried out under provincial leadership. As in (b), the provincial government controls apprenticeship training through the regulation and strict adherence to training schedules. However, some flexibility is provided to both the individual trainee and his employer through a positive attitude towards accreditation, provision of extensive training counseling for the employer and only limited mandates of compulsory certification. In order to work well, this approach requires a certain amount of cooperation between the partners in the training relationship as well as the acceptance of provincial leadership in matters of vocational training.

In terms of provinces falling into either of these categories, Saskatchewan, Manitoba and Nova Scotia probably come closer to (a), Alberta, Ontario and Newfoundland are either in (c) or fall somewhere in between (b) and (c) and British Columbia appears at the present time as the most interventionist province, coming closest to (b). Quebec must be considered a special case in that it has strict regulations for certification but very loose, almost non-extistent administrative control over training, although some reorganizaing is taking place at the present time.

The second area where provinces have attempted to effect training effectiveness is through changes in vocational training aimed at either correcting low quality on-the-job training or providing better linkages between off-the-job and on-the-job training. Provision of more up-to-date equipment and curricula in schools and increases in the amount of institution-based training were among the major changes carried out. Once again, large inter-provincial variations in both philosophy and content prevail. A number of provinces, notably Ontario, have been engaged in a fair amount of experimentation both with respect to content and length of training, and the split between off- and on-the-job training which in the main were inspired by the notion that an improvement and expansion of the institution based portion of training was called for. In other provinces, such as Alberta, special efforts have been expended on promoting better on-the-job training through increases in the counseling, monitoring and controlling function of the apprenticeship training board.

As was indicated earlier, curriculum design and, hence, regulation of apprenticeship training is subject to partisan influences within provincial governments. Often, even within apprenticeship training branches, conflicts simply reduce to the question as to whether the views of educationists and the education system, or those representing labour market and employment conditions, should be heard. That is, we find a perrenial conflict between the departments of labour and education. It appears that two structural variables, the growth and prominence of formal education within provincial systems of education, and the organizational structure of the apprenticeship training systems, condition the general direction of curricular designs and curriculum reform. As to organizational structure, some provinces have attempted to contain conflict and provide a more balanced input for curriculum design by combining education and manpower departments into one coordinated entity such as for example, was the case in Alberta. Others have matters of curriculum design carried out in coordination with departments of continuing education, as in New Brunswick and Saskatchewan. Alternatively, the major curriculum design function can be left in the Department of Labour (as in Newfoundland, Quebec, Nova Scotia, British Columbia, and Manitoba). This may lead to strong interdepartmental conflicts and lack of cooperation where a large and powerful education department and education lobby exists, such as is true, for example, in Quebec and British Columbia. Ontario houses apprenticeship training together with industrial training in its education ministry--a reflection of that ministry's prominence in the province.

The second factor merely relates to the size and expansion of formal schooling relative to technical and vocational education and training, and as such reflects the likely influence of those who are more interested in academic achievements and expansion of formal schooling.

If we consult the two measures of (a) expansion of post-secondary education and (b) full-time industrial and vocational education expressed as a percentage of the population aged 18-24 (see Table 6 at the end of this chapter), and contrast these measures with the expansion of apprenticeship training (Tables 2 and 3), we find the system of education in Quebec, Ontario and British Columbia, in that order, dominated by a relative expansion of formal schooling, while the growth in other provinces is much more balanced. Even though both British Columbia and Ontario are presently working towards a better balancing of formal and vocational education and training, this must be considered a very recent phenomenon. For, throughout history, including the post-war period, concerns of academic and formal schooling and institutionalization of training prevailed over employer-centered forms of training. This primacy of academic concerns has heavily influenced institutional arrangements, intra-provincial decision-making, and prevailing perceptions and attitudes in labour markets.[26]

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[26] A theme to which we will return in Chapter III where we will analyze market adjustment processes under differing response mechanisms of education and varying labour market conditions.

Regulation of Apprentice-Journeymen Ratios

According to both unions and those who regulate apprenticeship training, the quality of the on-the-job training can be influenced by the number of qualified journeymen available to provide on-the-job instruction. It was within the context of this argument that apprentice journeymen ratios were originally developed. There are numerous alternative ways which could equally improve on-the-job training and instruction, such as better instructor training, development of company training schedules, establishment of in-plant training centers, etc., etc., which are neither stipulated nor regulated. Thus, it is highly questionable whether apprentice-journeymen ratios should be considered the only appropriate measures of controlling the quality of on-the-job training.

According to our interpretation, the stipulation of ratios through either legislation or through collective agreements reflects the will and ability of the private partners to the training relationship to manipulate the labour supply and thereby enhance short-term economic group interests. From a wider perspective, the process of specifying apprentice-journeymen ratios appears to display a more fundamental problem, e.g. a secular deterioration of the employment relationship and the industrial relations climate which has become dominated by a strategic posturing over short-term labour supplies: unions attempting to restrict training and labour supplies and management attempting to obtain cheap production labour from apprentices.[27] Evidence can be found in the extreme variability of these ratios across trades with different degrees of union/management power. For example, highly unionized trades such as construction show much higher ratios of up to 1:7, while non-unionized service trades can reach lows of 1:1. While the maximum number of apprentices who can be indentured in relation to employed journeymen in most provinces is established through legislation, it is frequently superceded by negotiated ratios, achieved in collective bargaining, which tend to be higher. While recognizing problems of private party labour supply manipulation, most provincial inquiries concerned with apprenticeship training have not drawn the logical conclusion, which would be to deregulate ratios and instead enforce higher quality standards of training at the work place[28] either through legislation or incentive programmes.

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[27] For references, see:

A. Fox, op. cit.

Dunlop, op. cit.

[28] A good example of this is the recommendation of Ontario's Task Force on industrial training, for reference, see:

Ontario Ministry of Colleges and Universities, Training for Ontario's Future (Toronto: OMCU, Manpower Training Branch, 1973), p. 144.

Regulation of Examination and Certification

To complete apprenticeship training, apprentices can undergo up to three examinations: a final exam of apprenticeship, an exam for tradesman qualifications, and interprovincial standards examinations. With the exception of the interprovincial standard test, all exams are developed provincially and are standardized within the province. Large variations in standards, however, exist across trades and provinces. Furthermore, there are interprovincial differences with respect to the timing of the exams, with some provinces allowing exams to be written immediately following the last in-school training period, while in other provinces the qualifying exam can only be written after the on-the-job time-serving requirement has been completed and consent has been given by the employer. As, for the most part, qualifying exams are developed and set by the provincial apprenticeship training branch (usually an apprenticeship training committee or sub-committee). It is important that they coordinate both the institutional and on-the-job content of training in the qualifying exams. Potential mismatches between the two have been reported[29] and can be the result of unrelated schooling, unrelated on-the-job training or unrelated exams, or any combination thereof. Judging by the high failure rates of apprentices undergoing qualifying exams in comparison, for example, to normal failure rates in formal schooling, this criticism is certainly valid and training quality must, therefore, still be considered as a key problem of apprenticeship in Canada.[30] Apprentices who have passed qualifying exams in their respective provinces can subsequently apply for and write the interprovincial standard examination, in some provinces SEAL certificates are issued to apprentices who pass regular journeyman exams with high marks (usually 60% or more). An indication of the provincial distribution of apprenticeship training programmes providing SEAL exams is given in Table 4 which indicates that in the provinces of Newfoundland, Prince Edward Island, Nova Scotia, New Brunswick, Manitoba and Saskatchewan more than 50% of the programme offerings make provisions for SEAL certificates, while this ratio is 50% or less in such provinces as Alberta, British Columbia, Quebec and Ontario. The forementioned variations likely also reflect provincial differences in outward migration rates for fully skilled journeymen.

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[29] Saskatchewan Department of Labour, Report of the Apprenticeship Review Committee (Regina: 1980), p. 12.

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[30] Not all provinces report failure rates. See, for example:

New Brunswick Department of Labour and Manpower, Annual Reports, reporting failure rates of 50% or more.

Ontario Ministry of Colleges and Universities, Training for Ontario's Future, reporting failure rates in the sixties and early seventies between 25% and 35%. Ibid., p. 159.

Governement du Quebec, Ministere de Travail, Rapport Annuel 1979, indicating failure rates around 15%. The province of Quebec is, however, known to have lower training standards.

Some, albeit imperfect, measure of success of provincial apprenticeship training and an indication of its quality, is given by the number of apprentices who apply for interprovincial exams, the proportion who pass, and the average grade obtained on those exams. Unfortunately, not all provinces report exam statistics to the Interprovincial Standards Program Coordinating Committee. As can be seen from Table 7 among those who do, P.E.I., British Columbia, Saskatchewan and Manitoba fare relatively better than the other provinces.

If an apprentice can show that he has worked in the trade for a prescribed number of years and if he has passed the exams, he is normally issued with qualification certificate. Grandfather clauses and various regulations in practice lead to the issuing of regular and temporary certificates to those who either possess a Red Seal certificate from another province, have worked and/or received similar experience and training other than apprenticeship[31] or who have passed journeyman examinations. For non-regulated trades, provinces usually only issue certificates of apprenticeship. Although routes to becoming a fully certified journeyman can vary appreciably from province to province and trade to trade, there has been no research and little discussion about the merits of alternative certification processes for trades without compulsory certification. The situation is very different in the case of trades licensing through compulsory certification. As with all occupational regulation, the licensing of tradesmen is defended in terms of securing the public interest with respect to the provision of adequate health, safety and information. The ascribed negative effects are usually listed as inefficiencies in commodity or service production, procedural injustice and non-justifiable income (wealth) transfer.[32]

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[31] The equivalency of which is either specified as special category regulations or defined to be under the discretion of interpretation by the provincial director of apprenticeship.

More specifically, compulsory certification is seen by many administrators of apprenticeship training as a means to improve trade standards of performance and safety which otherwise would yield a secular decline in the quality of skills on account of short-run profit maximizing behaviour of producers (employers) substituting lower for higher levels of skills and individuals specializing for more narrow entry level skills. As partial evidence, one can, for example, compare the long-term secular decline of apprenticeship and skilled worker employment in favour of the employment of semi-skilled and unskilled workers in Canada or the U.S.A. with European countries where these declines have either not occurred or on a much smaller scale and where, for designated occupations, apprenticeship is compulsory.[33] At the same time, recent comparative research has linked industrial excellence to the presence of well developed vocational training systems in the latter countries.[34] On the negative side, compulsory certification, particularly in Canada, is seen as a device to secure monopolistic prices and incomes by unions retaining jurisdiction over certain tasks particularly where overlaps with other trades occur. Similarly, industry can use regulation to establish and fence in areas of business. Governments invariably are, therefore, called upon to rule certain tasks "in" or "out" of trade descriptions and, hence, a long list of exempted tasks or exempted industries had to be developed.[35] Since not all tradesmen in a compulsory trade came through apprenticeship but can also qualify with minimum claims either through job experience or training particularly in provinces with a high intake of immigrants, licensing may also yield varied experience and skills, quite apart from producing procedural injustices. Finally, since in most provinces, apprenticeship counsellors are expected to police employers and tradesmen to ensure that certificates are held in compulsory trades, while promoting apprenticeship in their role as training counsellors, a good part of their work must be rendered ineffective on account of this double role.

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[32] For an excellent treatise, see:

R.G. Evans and W.T. Stanbury, "Occupational Regulation in Canada," Working Paper/WS111-17, Law and Economic Programme, Faculty of Law, University of Toronto.

Specific issues relating to problems of licensing tradesmen are also contained in: Training for Ontario's Future, Ibid., p. 15.

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[33] See OECD, Policies for Apprenticeship, Ibid., Table 1.

[34] B. Lutz, Bildungssystem und Beschaeftigungsstruktur in Deutschland und Frankreich in: H.G. Mendius et.al. Betrieb-Arbeitsmarkt-Qualifikation, Vol.1, Frankfurt, 1976.

M.Maurice, A.Sorge and M. Warner, "Societal differences in organising manufacturing units: A comparison of France, West-Germany and Great Britain," Organisation Studies, Vol. 1, No. 1, pp. 59-86.

It seems, at least to the author, that a final verdict on the usefulness or harmfulness of trades licensing can only be provided by evaluating it within the broader framework of the Canadian systems of education and industrial relations. To the extent that our education system has in the past shown a committed bias towards formal schooling, supported by extensive licensing of professional and para-professional occupations, it may no longer provide an optimum balance between vocational and technical education and training, on the one hand, and formal schooling on the other.[36] Deregulation in apprenticeable occupations would only make sense, therefore, if accompanied by strong deregulation in all other occupations involving formal education, otherwise polarization of skills would increase, leading to an over-expansion of numbers of highly educated who work alongside, and presumably control, less skilled and less trained manual workers. Compulsory certification, while not desirable in itself, would be the lesser evil in that it would balance the needs of vocational versus formal schooling and thereby check the idiosyncrasies of growth in general education.

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[35] See: Training for Ontario's Future, Ibid., pp. 158-160.

Similarly, attempts to manipulate labour supplies through compulsory certification must be seen in the context of an adversary industrial relations system characterized by lack of co-operation, a short-term employment relationship, and inherently unstable employment conditions. While it is highly questionable that deregulation of trades would improve industrial relations, there is, judging by foreign experience, every reason to believe that improved industrial relations would make compulsory certification less necessary. Given the controversy surrounding compulsory certification, and the differing philosophies to be found throughout Canada, an attempt will be made in the empirical part of our investigation to distinguish between compulsory and non-compulsory trades and evaluate their significance and enrolment response to varying economic conditions.

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[36] This view is becoming increasingly accepted by a large number of social scientists engaged in research on education. For some references, see:

R. Collins, The Credential Society (New York: Academic Press, 1979).

R. Freeman, The Over-Educated American (New York: Academic Press, 1976).

I. Berg, Education and Jobs (New York: Praeger, 1970).

For some criticism with respect to the expansion of formal education in Canada, see:

OECD, Review of National Policies for Education in Canada (Paris: 1976), op. cit.

2. Recruitment and Placement of Apprentices

While there are interprovincial variations with respect to the process of recruitment and placement of apprentices it appears that throughout Canada, this process is heavily beset by inadequate student counseling regarding abilities, skills and jobs. All studies which have so far been undertaken to attain attitudes and levels of information relating to the system of apprenticeship training have concluded that the great majority of apprentices have had no prior exposure to apprenticeship while in high school.[37] Since, according to collective agreements, most guidance counsellors in high schools have to hold teaching certificates, these results are not surprising.

With the exception of a few employers, perceptions and knowledge about the potential benefits of apprenticeship training are similarly biased or non-existent.[38] For service and manufacturing occupations, workers invariably find their own way into apprenticeship after having experimented with different jobs and industries, which in turn explains the relatively high age of Canadian apprentices. They can be, and in recent years have been, aided by provincial apprenticeship officers and counsellors of the Employment and Immigration Commission. Some provinces have launched information programmes in high schools while, persuading employers to take on more apprentices. In the construction industry, particularly, where union hiring hall procedures are in force, placement of apprentices often is controlled by the trade unions and as such, subject to the interest of their members.

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[37] According to unpublished results from a recent survey conducted by the Training Branch of the Dept. of Employment and Immigration, over 80% of all apprentices surveyed in Ontario and British Columbia had while in high school, either received no advice or the advice to continue education in the university. Similar results have been reported by M. Fenn, op. cit.

[38] For some empirical evidence, see:

T. Harvey, Barriers to Employer Sponsored Training in Ontario (Toronto: Ministry of Colleges and Universities, 1980).

3. Support of Apprenticeship Training Through the Federal Government

As was indicated in Chapter I, federal involvement in provincial apprenticeship programs is governed by the AOT Act of 1967, specifically, Section 5(2) and its amendments of 1971.* The act provides for the government of Canada to enter into contracts with the provinces for the reimbursement of costs associated with the statutorily required off-the-job (institutional) portion of apprenticeship training. In addition to subsidizing the institutional portion of training, the federal government, through the Unemployment Insurance Commission, also provides for training allowances to those apprentices who are not eligible for unemployment insurance while attending school. Even though the cost reimbursement contracts under the AOT act include a clause which requires the provinces to consult with the Commission on programme changes and actions that may in a major way affect funding, the federal government's ability to control apprenticeship training for cost effectiveness is rather limited. Hence, for all practical purposes, it is fair to say that nature, structure and organization of apprenticeship training are beyond the influence of the federal government. Partly because of this and in order to further support apprenticeship training, the federal government purchases a large number of training seats for pre-employment training in trades which are designated for apprenticeship. Interprovincial variations notwithstanding, graduates from these courses usually are accredited with up to one year of mandatory work time and portions of the institutional training. In addition, the federal Department of Employment and Immigration supports apprenticeship training through employer subsidies for apprentice wages of up to 20 weeks by reimbursing a portion of wages. In 1978, the Critical Trades Skill Training programme was installed and allocated resources to the training of apprentices in areas of skill shortages.[39] Although the federal government has been concerned throughout the existence of AOT with questions of programme design and although it has been engaged in the development of training schedules and guidelines,[40] its role has been that of a funding agency equipped with limited functions of control.

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*At the time of writing, two furtner amendments of AOTA passed the House of Commons. They contained a new definitions of training to cover prgrammes over 52 weeks and trainees out of school for less than 12 months and provisions for the federal government to enter directly into training arrangements with employers and/or other professional group.

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[39] In 1979-80, a total of $860,000 was spent involving 502 trainees, see:

Employment and Immigration, Annual Statistical Bulletin, December 1980.

[40] E.g., many apprenticeship training schedules in the Maritimes have been developed in cooperation and with the help of the federal government.

The federal government, through the training branch of the Department of Manpower and Immigration, was, however, able to introduce some measure of standardization into apprenticeship training through the establishment of its Red Seals programme. The Red Seal is affixed to the journeyman certificate of persons who have passed an interprovincial examination entitling them to work as a qualified journeymen in another province. Exams are standardized throughout Canada and are set up by the Interprovincial Standards Committee, which consists of all provincial apprenticeship training directors plus a chairman and secretary provided by the Department of Employment and Immigration. In some provinces and some trades, apprentices only write an interprovincial exam, and receive a red seal if they pass the exam above a certain mark.

4. Interprovincial differences in apprenticeship training: A summary overview

The effectiveness of various provincial apprenticeship training systems in providing an adequate supply of skilled tradesmen can be analyzed both in terms of quantity and quality. To be meaningful, the exercise has to be placed in the context of interprovincial variations in the supply of alternate sources of skilled manpower as available through immigration, full-time schooling and competing manpower training programmes (Table 6).

In relative terms, and also almost in absolute terms, the province of Alberta has become Canada's largers trainer of apprentices with close to 1% of its labour force undergoing apprenticeship training, followed by British Columbia, New Brunswick and Newfoundland. Both Quebec and Ontario train only a very small proportion of their labour force[41] (see also Table 3 in Chapter I). While most provinces have designated apprenticeship training programmes in a range of between 20 to 45 occupations, Ontario and British Columbia show a much greater proliferation, reflecting both a more diversified economy and a greater readiness to move into new (often split off) trades in response to requests from industry. The latter has implications with respect to the number of trades having interprovincial standards examinations. While on average 50% of all registered apprentices are in programmes with Seals Examinations, the percentage is only about 25-30% for British Columbia and Ontario (see Table 4). In terms of average programme size, Alberta again leads with an average enrolment of apprentices of 257 followed by Quebec (186) and Ontario (138) (see Table 6).

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[41] Recently released figures for 1980-81 show, however, a considerable jump for Ontario.

Apprenticeship training is very sensitive to economic conditions with apprenticeship registrations closely following economic cycles, an aspect which will be further explored in Chapters III and IV dealing with economic determinants. Here we simply want to put the variability of apprenticeship registrations both on account of economic cycles and other instability due to changes in alternate skill supplies in the context of interprovincial and intertemporal comparisons. Saskatchewan, Manitoba and Newfoundland are the most stable systems with Alberta, New Brunswick and Nova Scotia holding an intermediate position (for comparisons, see Tables 4, 5, and 6). A possible first explanation may be the far greater importance of formal schooling and immigration (and its variations) as alternate sources of skilled manpower in the former three provinces as compared to Manitoba, Newfoundland and Nova Scotia. Chapter IV will provide some empirical tests as to the validity of this hypothesis.

When combining measures of programme growth, enrolment variability, average programme size and relative size of apprenticeship training with respect to the provincial labour force, Alberta clearly leads all other provinces, followed by British Columbia and New Brunswick. In Quebec, apprenticeship training can safely be regarded as an unimportant source of skilled manpower development.

Interprovincial variations in quality are far more difficult to assess than mere quantity variations, and the situation is further complicated by the fact that some provinces have more information available than others. Although ideally one would need measures of quality with respect to the selection, training and qualification of apprentices, only partial evidence with respect to any of these measures is available. Keeping this caveat in mind, we compare below provincial apprenticeship training systems in terms of the level and growth of cancellations of apprenticeship (Table 5), number of trades under interprovincial standards examination (Table 4), and the success of apprentices in completing these SEALS examinations (Table 7).

If we consult the growth of cancellations relative to registrations per decade and over the entire period 1961-79, the following rankings appear: Alberta, New Brunswick and Ontario, (in that order) show the most balanced growth with cancellations growing at the same or a lower rate. Quebec, Newfoundland and Nova Scotia lie at the bottom with cancellations growing faster than registrations in some or all trade categories (e.g. Quebec). Another interesting result is the much faster growth of cancellations in service trades relative to all other apprenticeship training, which seems to point at either some structural problems of training or low pay in service occupations (Table 5). With respect to participation and success in the interprovincial standards exam programme, the picture is mixed and, furthermore, hides political motives in the case of Newfoundland and Alberta, two provinces with some reluctance in programme participation on account of their population and manpower policies. In terms of the ratio of journeymen completion with and without SEAL, P.E.I, Manitoba and Saskatchewan, all out-migration provinces, show the highest rate of participation in the SEAL programme, with Quebec and British Columbia being at the lower end. In terms of failure rates and average mark achieved, the western provinces, British Columbia, Saskatchewan and Manitoba and Prince Edward Island, fare, relatively, very well and Quebec, once more, appears at the bottom. No information is available on Alberta.

In putting these performance indicators into perspective with existing interprovincial variations in skilled worker immigration, education systems, manpower training programmes, and the previously described provincial administrative structures and regulatory postures with regard to apprenticeship training, the following picture and tentative conclusions emerge:

Quebec shows a very similar approach to apprenticeship to that found in France, where the basic idea has been to replace it or substitute it with technologist and technician training at least in manufacturing and service trades. This is documented by the rapid and continuing expansion of post-secondary enrolment in both universities and colleges, which since 1976 has dropped in all other province (see Table 6). Apprenticeship training is low in both quantity and quality as is also being recognized gradually by Quebec provincial authorities.[42]

The other two provinces which have shown a rapid increase in post-secondary education at least until 1976, e.g. Ontario and British Columbia, are in the process of restructuring education with colleges becoming more heavily involved in technical training including apprenticeship. It seems that in terms of the education system already in place, both provinces would favour a system which is commonly found in the Scandinavian countries, e.g. co-op education or full-time vocational schooling for apprenticeable occupations. Heavy emphasis is therefore placed on encouraging the education system to change curricula and adjust to the new manpower needs of the province. Already in the seventies, for example, Ontario spent half of the total federal funds earmarked for training improvement projects in apprenticeship (see Table 8). Given the rapid decline in immigration and increases of outward migration the province of Ontario has been under extreme pressures to adjust quickly to this new situation in the late seventies. The third approach, to be found mainly in Alberta, is a longer-term orientation with respect to the development of skilled manpower supplied which attempts to simultaneously improve the quantity and quality of training, both on-the-job and in the institutions. It probably comes closest to the dual type apprenticeship training found in Central-European countries such as Germany, Austria and Switzerland. The conditioning factors were: less dependence on immigrants and the formal education system, and a longer-term orientation with respect to the development of manpower than was found in any other province. Not surprisingly, Alberta also showed least dependence on federal manpower training initiatives throughout the seventies (see Table 6).

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[42] See, for example:

Gouvernement du Quebec, Adult Education in Quebec: Possible Solutions, Work Document, Quebec, 1981.

The other provinces, while interesting from the point of view of specific programmes and curricular reforms (notably, New Brunswick), are less important in terms of overall programme size. As a first tentative interpretation, we would, therefore, argue that apprenticeship training in Canada is primarily conditioned by changes in immigration and the provincial expansion and philosophies in education, where the latter has become an industry regulated, in part, by federal/provincial agreements. While the province of Alberta has shown much more independence in this respect, the federal Adult Occupational Training Act must have similarly affected this province as explained by Villet[43] in his analysis of occupational training in Alberta:

> '..in dealing with federal-provincial agreements, it has become apparent that it is necessary to have a provincial organization that is flexible and diversified to enable the province to fulfill the terms of the agreements as they change their emphasis. Involved are relatively sophisticated programs, involving complicated hand skills, understanding of reasonable complex principles and also programs involving the development and operation of programs for illiterates, and for culturally and socially deprived groups. Besides the A.V.T. Centres, Alberta Vocational Training must utilize training institutions available in the communities such as technical institutes, colleges, Agricultural and Vocational Colleges, vocational high schools and private training institutes. By this means, greater utilization of agreements can be achieved and the programs expanded

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[43] J. Villet, quoted in: D. Young and Machinski, Ibid., p. 55.

> to meet federal demands without expending funds for more buildings and equipment which might become redundant as the federal government constantly changes its emphasis to meet economic needs.'

Whether federal-provincial agreements have indeed been overriding factors regulating vocational education and training at the provincial level, or whether, and to what degree, market pressures may have equally contributed to it will be explored next in Chapters III and IV.

Table 4

Provincial Distribution of Apprenticeship Training Programmes by Type, 1981

Province	Total Number of Registered Programmes in 1981		Total Number of Apprenticeship Programmes by Sector in 1981			Percentage of Apprenticeship Programmes with Interprovincial Standard Exam 197
	With Compulsory Certification	With Voluntary Certification	Manufacturing	Services	Construction	
Newfoundland	2	29	8	10	13	81%
Nova Scotia	9	15	6	7	11	54%
Prince Edward Island	6	27	5	15	13	92%
New Brunswick	7	43	13	23	14	49%
Quebec	31	0	8	9	14	28%
Ontario	16	42	9	31	18	25%
Manitoba	2	30	12	4	16	71%
Saskatchewan	12	18	3	8	19	76%
Alberta	14	31	10	13	22	50%
British Columbia	4	94	27	41	30	29%
Yukon	2	13	5	4	6	n/a
Northwest Territories	0	35	9	12	14	n/a

Sources: Ellis Chart, Training Branch, Employment and Immigration Canada, 1981.

Figures of SEAL programmes in 1979 from unpublished material, Interprovincial Standards Committee, Employment and Immigration Canada, 1979.

Table 5

Average Growth Rate Registrations, Cancellations and Completions Canada and Provinces, 1961-1970 and 1971-1979

	Province	Registrations		Cancellations		Completions	
		61-70	71-79	61-70	71-79	61-70	71-79
Construction Trades	Newfoundland	8.87	38.29	38.80	120.69	9.12	193.97
	P.E.I.	27.92	39.79	122.62	107.74	100.59	97.48
	Nova Scotia	15.27	20.64	27.79	92.03	20.91	133.05
	New Brunswick	32.91	30.16	34.12	31.78	24.51	115.61
	Ontario	25.34	63.78	7.17	39.43	9.82	159.84
	Manitoba	5.47	16.51	7.89	28.33	5.56	114.34
	Saskatchewan	6.06	23.58	13.90	15.38	19.41	114.06
	Alberta	12.76	34.69	8.79	44.47	11.50	20.49
	British Columbia	14.75	17.62	27.55	31.94	21.47	4.45
	Yukon	-	7.13	-	64.04	-100.00	135.55
	N.W.Territories	36.67	26.25	44.87	149.34	20.83	77.67
	Canada	11.15	73.22	11.56	94.07	8.57	195.33
Service Trades	Newfoundland	66.62	71.01	-16.67	49.73	150.00	282.38
	P.E.I.	-	62.50	-	42.92	-	-75.00
	Nova Scotia	165.55	27.10	11.98	101.69	-22.76	188.99
	New Brunswick	314.23	13.88	-8.36	85.05	-19.67	92.71
	Ontario	33.69	27.38	43.41	28.24	39.27	105.02
	Manitoba	31.69	34.86	65.87	27.61	-23.15	154.23
	Saskatchewan	25.94	21.79	78.91	8.72	1.11	82.89
	Alberta	0.20	26.20	0.60	26.57	5.85	3.30
	British Columbia	14.59	51.89	20.27	58.12	5.77	33.48
	Yukon	-	-	-	-	-	-
	N.W. Territories	-50.00	34.03	0.00	39.86	0.00	36.36
	Canada	26.90	261.44	43.07	193.10	19.89	169.93
Manufacturing Trades	Newfoundland	54.10	62.44	-5.03	189.03	59.28	152.14
	P.E.I.	-50.00	89.82	100.00	107.29	-	62.50
	Nova Scotia	15.29	21.88	51.12	335.51	20.67	136.47
	New Brunswick	18.07	45.21	45.83	27.31	46.65	95.80
	Ontario	18.73	31.72	24.50	37.65	24.55	101.49
	Manitoba	10.77	26.02	80.67	32.16	30.11	140.43
	Saskatchewan	9.49	21.34	3.23	20.41	24.56	128.47
	Alberta	10.90	27.65	1.76	39.34	18.58	-8.22
	British Columbia	24.94	61.33	20.53	32.77	16.18	-10.75
	Yukon	-	69.05	-	-44.44	-	104.17
	N.W.Territories	0.00	30.91	-25.00	59.03	-	148.67
	Canada	17.59	36.28	16.91	38.59	17.16	121.97

Source: Own Calculations

Table 6

Performance Indicators of Apprenticeship Training Canada and Provinces

	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Yuk.	NWT
Cancellations as a % of registrations in 1979	28.9	42.7	30.3	45.2	129.5	38.4	35.2	38.1	27.4	38.1	10.5	76.4
Average number of registered apprentices per programme in 1979	41	16	46	37	186	138	44	61	257	98	-	-
Provincial ranking of variability coefficient for registrations 1961-79 from high (1) to low(9)	8	n/a	6	5	2	1	9	7	4	3	-	-
% of registrations Under compulsory certification 1961	0	0	.35	.29	n/a	.27	n/a	.66	.39	.17	-	-
1979	.14	.35	.43	.39	1.0	.52	n/a	.73	.63	.12	-	-
% of apprenticeship completions with SEAL certificate in 1979	82%	98%	88%	74%	68%	77%	96%	95%	71%	58%	-	54%

Source: Own calculations from registrations and cancellations statistics, Survey of Vocational and Technical Training and Apprenticeship Statistics Training Branch, Employment and Immigration.

n/a - not applicable

Table 6 (continued)

Year	Nfld	PEI	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Canada
Enrolment in Federal Manpower Training Programmes (excl.apprenticeship training) as a percentage of the provincial population aged 18-24											
1970/71	13.8	41.5	10.5	13.7	18.3	6.2	8.0	7.0	4.5	10.6	
1978/79	9.5	44.9	8.6	5.1	5.6	4.7	7.0	4.2	2.7	7.3	
Full-time Enrolment in Technical, Vocational and Composite High Schools as a Percentage of Age Group 18-24											
1961/62	1.1	1.5	1.2	7.9	3.9	12.7	4.8	5.8	8.8	6.2	
1968/69	-	7.3	2.4	13.6	-	27.8	7.0	4.4	11.1	10.0	
Post Secondary Enrolment as a percentage of the population aged 18-24 - Selected Years											
1961	3.8	8.5	10.3	9.7	10.7	8.9	9.4	9.8	7.8	10.7	
1967	8.4	11.4	14.0	13.4	15.1	12.3	13.8	13.5	14.0	14.5	
1976	10.8	14.7	19.0	13.4	22.5	20.7	16.5	14.1	18.1	15.6	
1979	10.3	13.2	17.6	12.6	24.5	19.2	14.6	13.5	16.2	14.0	
Landed Immigrants in Apprenticeable Occupations as a Percentage of Apprentice Registrations											
1975	10.9	8.2	11.8	10.8	35.0	102.5	79.0	24.1	40.0	40.7	67.9
1979	3.6	12.5	0.6	0.7	39.2	39.9	37.7	20.9	14.3	15.9	24.8

Sources: Enrolment in Manpower Training Programmes from Annual Reports, Dept. of Manpower and Immigration.
Secondary and Post-secondary enrolment figures from: Education in Canada, Statistics Canada, 81-229.
Immigration figures from special tabulations provided by Statistics Canada.

Table 7 Average Mark and Average Percentage Passed in Interprovincial Exams for the Provinces for 1978/79

Province	Jan 1/78 - Dec 31/78				Jan 1/79 - Dec 31/79			
	Average % passed		Average Mark		Average % Passed		Average Mark	
	Comp. Appr.	Trade Qual.	Comp. Appr.	Trade Qual.	Comp. Appr.	Trade Qual.	Comp. Appr.	Trade Qual.
Newfoundland	81.7	52.5	76.8	67.0	80.1	50.2	76.6	60.1
Nova Scotia	72.4	49.2	72.3	60.3	68.0	43.1	72.8	64.6
P.E.I.	94.1	87.5	78.1	71.7	87.7	80.7	74.6	68.3
New Brunswick	54.9	27.8	70.8	62.3	57.0	37.8	68.7	58.5
Quebec	16.0	19.4	53.3	51.8	-	13.9	-	52.5
Ontario	86.1	53.5	63.3	58.4	82.8	57.2	69.9	61.1
Manitoba	89.8	47.3	75.6	65.8	90.4	46.2	77.9	66.3
Saskatchewan	80.3	66.6	76.9	76.7	88.1	71.7	76.7	72.8
Alberta	-	-	-	-	-	-	-	-
British Columbia	97.3	66.9	77.8	72.1	95.7	76.2	80.3	73.9
N.W. Territories	80.4	92.4	77.9	76.5	99.2	68.1	79.7	71.9
Yukon	100.0	96.8	84.9	77.5	100.0	100.0	81.7	80.2

Comp.Appr. = Apprenticeship completion
Trade Qual. = Tradesmen Qualification

Source: Calculations based on information contained in:
Interprovincial Standard Examinations, Interprovincial Standards Committee, Dept. of Employment and Manpower, Ottawa

Table 8

Federal Subsidies for Training Improvement Projects

in Apprenticeship Training - Canada and Provinces

1974 - 1980

	74-75 '000	75-76 '000	76-77 '000	77-78 '000	78-79 '000	79-80 '000	Total '000	% Dist	# Projects
Newfoundland	95.7	198.3	109.9	193.8	135.7	3.9	737.3	6.3	37
P.E.I.	36.9	61.9	44.4	45.5	114.5	-	303.2	2.6	21
Nova Scotia	152.2	230.0	129.6	345.0	206.0	-	1062.8	9.1	43
New Brunswick	208.9	207.5	118.7	209.8	182.7	73.8	1001.4	8.5	27
Quebec	476.0	10.9	616.2	275.1	32.6	-	1410.8	12.0	16
Ontario	378.5	1276.2	1295.1	897.6	1250.7	-	5098.1	43.4	59
Manitoba	76.5	72.6	40.5	58.6	34.3	7.5	290.0	2.5	16
Saskatchewan	49.0	8.8	6.4	9.7	24.3	-	98.2	0.8	9
Alberta	268.2	127.4	166.7	183.4	211.2	7.3	964.2	8.2	29
N.W. Territories	5.7	20.8	20.5	19.3	37.4	-	103.6	0.9	12
British Columbia	119.7	55.3	122.7	211.9	54.2	-	562.8	4.8	23
Yukon	-	4.5	8.1	15.2	10.6	-	38.4	0.3	3
National	-	-	29.6	38.0	-	-	67.6	0.6	4
Canada	1867.3	2274.2	2707.4	2502.9	2294.2	92.2	11738.4	100.0	299

Source: Employment and Immigration Canada - Annual Statistical Bulletin 1979-80.

CHAPTER III

1) The Economics of Apprenticeship Training: A Human Capital Theoretical-Approach

Before analyzing a host of labour market imperfections and institutional constraints imposed by provincial systems of education relevant to apprenticeship training, this section first outlines the theoretical frame of reference in the economics of training in order to develop testable hypotheses with respect to the expected behaviour of apprenticeship training in the Canadian economy. In so doing, we primarily focus on recent contributions of Human Capital Theory as they apply to voluntary servitude and apprenticeship, search and recruitment behaviour, and the economics of internal labour markets.

The development of skills when viewed as an investment activity essentially involves two key questions e.g., how is the investment to be financed, and what form of collateral or enforceable property right can be secured for this type of investment. This was as much true for intrafamily skill transfers and voluntary servitude in the past as it is for the modern variant in the form of apprenticeship training. In the case where parents or other adult family members passed on productive skills to the next generation, human capital costs (both opportunity costs of home instruction and market purchases of instruction) were arranged through borrowing within families and extended families and those receiving such financial support and training were expected to use their acquired skills for the welfare of the group providing the support. This expectation tended to be strictly enforced through family force and/or social approbrium.

The problem of collateral was similarly considerably eased in the case of voluntary servitude for by tying the servant long enough to the master to recover costs of skill development a long-term voluntary servitude contract could be arranged which could be beneficial to both parties provided that the present value of expected benefits were to exceed the discounted value of expected costs for both servant and master, e.g.:

$$PV^{B}_{\substack{\text{Servant}\\\text{Master}}} \geq PV^{C}_{\substack{\text{Servant}\\\text{Master}}} \quad \text{or} \quad \sum_{t=1}^{T} \frac{W_t^*}{(1+r)^t} \geq \sum_{t=1}^{T} \frac{W_t}{(1+r)^t} \quad \text{for servant}$$

and

$$\sum_{t=1}^{j} \frac{S_t}{(1+r)^t} \geq \sum_{t=1}^{j} \frac{P_t}{(1+r)^t} \quad \text{for master}$$

where W^* are expected earnings under servitude, W are alternative earnings in the market, r is a market rate of interest, T is the employment or job horizon of the servant, J is length of the period of indenture, P are payments to the servant and

S are productivity contributions by the servant.

The economic interests of the partners to the apprenticeship contract are strikingly similar to the voluntary servitude contract, although other major differences exist, many of which are legal in nature. Master Craftsmen (Employers) are, for example, not bound by law to provide a particular level of skill nor are there any easy, low cost, means for assuring that apprentices will remain attached for the entire length of apprenticeship training. These considerations, however, are important to the financier (assuming this to be the employer) since he might expect to recover the biggest portion of his investment during the latter part of the apprenticeship training period. And in contrast to indentured servants, there is no public or law which bears the cost for maintaining the contract. In the absence of such enforceable property rights, human investments become risky both for the employer and the trainee, for the financing now becomes conditioned on some expectations as to the future attachment of workers to firms and employers to workers both during and after training.

In response to this absence of legally enforceable property rights, other institutional practices developed which all essentially tried to reduce human capital risks. Given both the bargaining strength of the partners to the contract and the degree of competition in the labour market such arrangements can either yield equal sharing of risks and costs

(Becker 1964) or may favour that partner who has the higher level of monopsony power (e.g. Donaldson and Eaton 1976).

If apprenticeship training is entirely general (e.g. leading to general marketable skills) and if journeymen are at the same time being paid competitive wages, apprentices are likely to finance their own training through lower wages during training for this would be the only way in which employers could recoup costs of human investments. Such financing arrangements may still be insufficient whenever training is very expensive, so that extremely low or even negative wages may have to be paid to apprentices. Paying for one's own apprenticeship was not uncommon in past history in either Great Britain or Continental Europe. In today's world of minimum wages and subsidized education, however, firms would have a hard time to attract apprentices who had to pay in order to work and receive training. Short of giving up training entirely firms can and do in this case devise different institutional arrangements which lead to a covering or lowering of costs and risks in human investments. Employers could e.g., seek an extension of the apprenticeship training period in order to lengthen the pay-back horizon for the investment or they could devise a deferred compensation scheme which would have a similar effect. As an alternative, firms may lower the quality of training (thereby reducing training costs) or only provide job- and firm-specific training. The latter option has the added advantage of tying both workers and firms, thereby alleviating collateral and financial capital constraints of the human investment. Since employers will pursue such cost/risk minimizing strategies even if training costs are not exorbitantly high, conflicts between management and labour with respect to the nature and length of training may arise (see also Scoville 1969). This will be heightened when competitive forces are weak and one side possesses some degree of monopsony power.

Length of apprenticeship training, its quality, and its potential regulation and policing, as well as the fixing of apprentice wages, are therefore by no means institutional trivia or pure political acts, but key economic instruments which influence the distribution of net returns from training and, therefore, the interests of both firms and workers.

The second area of human capital theory which is of considerable relevance to questions of employer-centered forms of training deals with economic determinants of employers' search behaviour (Stigler 1962, Rees 1966, Shultz and Rees 1972, Nickell 1976). As a rule, employers will be faced with a vaguely identified distribution of prospective quality among the available labour force by occupation. To the extent that firms train their own labour force, this qualitative uncertainty will be heightened for the employer since he has to judge both trainability and the post-training productivity behaviour of recruits. A cost-minimizing (or profit-maximizing) employer will seek to maximize the expected quality of his recruits from the actual or expected distribution of skill via the following marginal calculus:

$$\frac{\Delta MP_r}{\Delta W_s} = \frac{\Delta MP_r}{\Delta C_1} = \frac{\Delta MP_r}{\Delta C_2}$$

e.g. in equilibrium, the changes in marginal productivity per dollars worth must be the same for alternate methods of search.

where MP_r represents the expected marginal product (skill level and other attributes) of each recruit, W_s is the starting wage, and the C_s' represent the marginal costs per recruit for alternative techniques of search (all figures should be read as present value estimates). This would imply that firms only engage in costly search if it is justified by expected long job tenure and a certain degree of firm specificity in training and post-training productivity. When skills are very general and journeymen wages very competitive, strong inducements will exist to use "cheap screening devices" rather than costly testing instruments. That is, firms would first reduce the number of applicants to manageable proportions by means of a fixed hiring standard and then pursue more extensive search within such narrowed samples (Rees 1966). Standards are fixed by proxy and strongly depend on employers' information and perceptions of labour quality in different population subgroups.

Typical low cost screening devices which apply to recruits in apprenticeship training are age, level of educational attainment[1] and experience. According to the search model outlined earlier, we would expect employers' search activities to be more extensive for private (non-registered) company apprenticeship training programmes or apprenticeship which contains a fair amount of firm-specificity. For all other forms of apprenticeship employers will tend to use some fixed hiring standards which will be set higher the greater the human investment risk (either in terms of training costs, post training quit-behaviour or expected productivity). Since hiring standards are norms which are set to facilitate screening and since they will be rarely arrived at by precise economic calculus, they are likely to change only gradually over time and only in response to major environmental changes. In this context, it should be noted that the use of hiring requirements as cheap screening devices can easily lead to statistical discrimination when employers have a truncated view of the labour market on account of perceived differences in the skill distribution of different populations. This holds true as much for the employment of apprentices as it holds true for other employment. Of particular interest in this regard are the proportion of minority groups (e.g., Metis and Indians) and females enrolled in apprenticeship programmes.

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[1] Employers can specify both level e.g., completed high school, college or grade 10 or type of institution e.g. technical college, composite high school or general high school.

In reckoning the presence of search, recruitment, and training costs together with the variable component of employment costs, neoclassical analysis can now provide an explanation of the behaviour and structure of organization-internal labour markets particularly with respect to promotion and training offered to specific groups of employees. In generalized form, employers will invest in search and training if:

$$Y = \sum_{t=1}^{T} (M_t + \Delta M_t)(1+r)^{-t} \geq \theta = \sum_{t=1}^{T} Wt(1+r)^{-t} + R + K$$

where Y is the stream of income θ is the stream of costs, W_t is compensation in period t, R are fixed recruitment costs, K are training costs, M_t is the marginal value product in t and ΔM_t is some positive function of K e.g., $\Delta M_t = g(K)jg' > 0$. If we set Y equal to θ, we find that each employer at equilibrium earns a periodic rent on his investment in search and training, with the size of this rent for each employee being

$$pi = \frac{R_i + C_i}{\sum_{t=1}^{T} (1+r)^t}$$

which at equilibrium must be the equivalent of:

$$p = M^* + \Delta M^* - W^*$$

where R_i and C_i are recruitment and training costs respectively and where *'s denote long-run values.

In more complete form, the model can be represented as follows:

$$\sum_{t=1}^{J} \overbrace{(M_t + \Delta M_t - W_t)}^{\alpha}(1+r)^{-t} + \sum_{t=j+1}^{T} \overset{\beta}{(M_t^s - W_t^s)}(1+r)^{-t} \geq \sum_{t=1}^{J} \overset{\delta}{C_t}(1+r)^{-t} + R$$

with the s subscript standing for the skilled worker category, with r being the discount rate, J representing length of training period and T being the expected tenure of the employee. For a newly hired employee to be trained at company expense, the wedge between M and W (e.g. α & β) must be sufficient to cover both recruitment and training costs. With no monopsony and general-type training $M_t^s = W_t^t$ and, hence, all training costs must be borne by the trainee either through a lower wage W1...Wj, payment of Ct or R by the employee or some combination thereof. The model can easily be expanded to develop employers' decision rules with respect to the choice of either promoting and training from within or hiring a skilled outsider. Insiders will be preferred as long as:

$$(Y - \theta)_I \geq (Y - \theta)_O$$

More specifically, the insider will be promoted and trained only if:

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$$\overbrace{\sum_{t=1}^{J}(M_t + \Delta M_t - W_t)(1+r)^{-t}}^{\alpha} + \overset{\beta}{\sum_{t=j+1}^{T}(M_t^s - W_t^s)(1+r)^{-t}} \geq \overset{\delta}{\sum_{t=1}^{J}C_t(1+r)^{-t}} + R$$

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$$(Y - \theta)_I \geq (Y - \theta)_0$$

More specifically, the insider will be promoted and trained only if:

$$\sum_{t=1}^{J} \overset{\alpha}{(M_t + \Delta M_t - W_t)_I(1+r)^{-t}} + \sum_{t=j+1}^{T_I} \overset{\beta}{\overbrace{(M_t^s - W_t^s)_I(1+r)^{-t}}} - \sum_{t=1}^{J} \overset{\delta}{(M_t^s - W_t^s)_O(1+r)^{-t}}$$

$$- \sum_{t=j+1}^{To} \overset{\partial}{\overbrace{(M_t^s - W_t^s)_O(1+r)^{-t}}} \geq \sum_{t=1}^{j} \overset{\ell}{(C_t(1+r)^{-t} - (R_O - R_I))}$$

If tenure expectations are equal (Ti = To), skills are general and labour markets competitive β, δ, ∂ are all 0 since $M_t = W_t$ and the equation then becomes

$$\sum_{t=1}^{J} (M_t + \Delta M_t - W_t)_I(1+r)^{-t} \geq \sum_{t=1}^{J} C_t(1+r)^{-t} - (R_O - R_I)$$

It follows that the company will only institute an internally financed training and promotion programme in general skills if the differential in recruitment/search costs and/or earnings relative to productivity during J exceed the disounted value of training costs. $(R_o - R_I)$ tends to be positive for many skilled owrker occupations, which should induce internal promotion and training. Where existing institutional arrangements create lower R_o's relative to R_i, entry ports could, however, be open at relatively high skill levels, which in turn induces little promotion and training. A good illustration of this would be the construction industry which is unionized. Under union hall hiring practices skills of journeymen are general and guaranteed by the union, R_o is low and $R_o - R_I$ may be even negative. Internal training and promotion can be expected to occur only if younger or inexperienced employees are willing to self-finance skill acquisition during J. As a consequence, we should expect standardized apprenticeship training and multiple entry ports which is what can generally be observed in construction.[2] Despite the case noted above, internal training may still exist in firms where training is not entirely general (but a hybrid of firm-specific and general training). Under these conditions

$$\sum_{t=j+1}^{T_I} (M^s - W^s)_I \ (1+r)^{-t} > 0$$

hence, insiders will be trained and preferred to already trained "apparently equivalent" outsiders provided that

$$\sum_{t=1}^{J} (M_t + \Delta M_t - W_t)_I (1+r)^{-t} + \sum_{t=j+1}^{T_I} (M_t^s - W_t^s)^{-t} \geq \sum_{t=1}^{J} C(1+r)^{-t} - (R_o - R_I)$$

In the case of entirely firm-specific training, the choice as to whether to train insiders or hire and, subsequently, train outsiders similarly involves the following calculus:

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[2] Historically, hiring halls had their origin in the irregular employment patterns of these industries and their consequently high R_os in the absence of such arrangements. Management would have an alternative strategy of maintaining a steady work force paying $W_t > M_t$, thereby avoiding turnover and high recurring R_os or, alternatively, find some other cheap screening device.

$$\sum_{t=1}^{J_I} (M_t + \Delta M_t - W_t)_I (1+r)^{-t} + \sum_{t=j_I+1}^{T_I} (M_t^s - W_t^s)_I (1+r)^{-t} -$$

$$\sum_{t=j}^{J_0} (M_t + \Delta M_t - W_t)_0 (1+r)^{-t} - \sum_{t=j_0+1}^{T_0} (M_t^s - W_t^s)_0 (1+r)^{-t} \geq$$

$$\sum_{t=1}^{J_I} C_{tI} (1+r)^{-t} - \sum_{t=1}^{J_0} C_{t0} (1+r)^{-t} - (R_o - R_i)$$

As can be seen above, training creates for either party a periodic rent for the period (TI - JI) or (TO - JO), if TI equals TO, JI equals JO, C_{ti} equals C_{to} and if markets are competitive, insiders will be preferred whenever $R_o > R_i$). That is, insiders have decided advantages over outsiders if their expected tenure is longer (e.g., E(Ti > To) and/or if their expected training time is shorter (e.g., E(Ji<Jo). This suggests that firms will take care to select those employees for training and promotion who are committed to a long J. However, even loyal employees may be passed over if they are old. Generally, one would expect management to select among both insiders and outsiders with largest (T-J), i = 1....2. Similarly, it can be argued that whenever external training or work experience is more complementary to firm-specific training than prior internal training and work experience, firms will prefer outsiders. This would typically include job categories and training programmes which require high

levels of general skills. For such skills acquired outside the firm often lower both direct and indirect training costs. Moreover, if training is easily ascertained, this may serve to lower Ro relative to Ri. This "credentials" effect would further strengthen the competitive position of accredited outsiders relative to "non-accredited" insiders.

To summarize, neoclassical human capital theory provides us with the following general hypotheses:

1) For an entirely general type training programme, training intensity (e.g. willingness of employers to train) will be higher the larger the difference between journeymen and apprentice wages, everything else being held constant.
2) Companies will institute an internally financed general-type apprenticeship training programme if there is a positive differential in recruitment and search costs relative to outside hires of fully skilled journeymen covering the costs of training over period J, again everything else being held constant.
3) Companies are willing to promote and finance training if it can be made more firm-specific so that the employer can create a periodic monopoly rent for an expected period of tenure, everything else being held constant.
4) The outcome of the skill bargain is uncertain, however, when both sides have some degree of monopsony power, which they would have in the case of entirely firm-

specific training. Management will have a tendency to reduce training to very job- and firm-specific tasks, will tend to remove licencing and/or regulatory arrangements where possible and/or aim for low trainee wages. Labour, on the other hand, may wish to control entry into the skilled worker trades and establish collective job rights and demand higher trainee wages. Furthermore, threat points in the skill bargain vary over the business cycle as the market position of the partners to the exchange is weakened and/or strengthened.

5) To the extent that an individual's skill development is associated with certain group characteristics (for reasons of informational inefficiencies in the labour market) discrimination may occur on the basis of expected differences in productivity, tenure and/or search and training costs between such subgroups as male/female, majority/minority or highly educated versus uneducated worker populations.

What can therefore be expected in terms of the secular behaviour of apprenticeship training in the Canadian context? Pressures to mount apprenticeship training programmes will likely be greatest in those occupations where employers face few, if any, cheap sources of substitute skills (in terms of both recruitment/search- and on-the-job training costs). Substitute skills are provided by the output of various formal schooling programmes including government manpower training programmes and through immigration. In this context, one has to assess the relative weight and importance attached by employers to specific skill components within training and/or schooling alternatives e.g., the importance of practical work-related experience and-training versus the importance of theoretical and general knowledge. Where firm-external training (schooling) is highly complementary to firm-internal promotion and training ladders (that is, where ample career mobility and flexibility exists in the organization-internal labour market) firms are likely to prefer outsiders with good schooling credentials over training insiders with lower levels of schooling.[3] Where training is best performed in a vestibule context (e.g. where work related training is important) and where there is little complementarity between skills from formal schooling and subsequent firm-internal training[4] employers will be more interested in on-the-job training schemes including apprenticeship. The latter explains e.g., the non-existence of Canadian apprenticeship training programmes in many service occupations other than maintenance, compared to other jurisdictions, notably West-Germany, for employers can cheaply access and hire shelf training provided by a large number of public and private sources such as community colleges, private trade schools and technical institutes or in some limited cases comprehensive high schools. Occupations which typically fall into this category are e.g., interior decorators and-designers, commercial artists such as photographers, retouchers, droughtsmen, travel consultants and most sales occupations, to name only a few. Furthermroe, whenever the education industry has been responsive to providing occupation specific skills, firms were able to lower both recruitment/search and training costs, which, when combined with the general higher level of educational attainment of those programmes also lowered costs of further training (and search) associated with normal promotion expectancies within firm-internal labour markets.

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[3] Particularly, if such outside training can also be ascertained (low informational uncertainty about skill qualifications) firms should be able to lower both direct and indirect costs of training and search/recruitment (C and R).

[4] This can be the result of either lacking upward mobility and promotability for particular jobs or occupations within the organization or of high quality uncertainty of schooling credentials.

Firms which traditionally may have operated on-the-job training programmes in these occupational categories, including apprenticeship, would have been induced to make secular changes in recruitment or hiring practices. An example which comes to mind is the replacement of internally trained travel consultants (who in the past were clerical workers with apprentice-type training) by graduates from community colleges.[5]

Similar phenomena can be observed in recreation, sales and artistic occupations. In empirically testing such hypothesized trends of manpower substitution, care has to be taken to consider separately the different character of manpower adjustment processes in smaller sized firms. For in smaller sized establishments, we often find less scope for specializational and less promotional flexibility which would impede substitution of better-educated outsiders for internally trained workers and which would suggest higher training intensity among smaller firms in certain branches (this is true, for example, in metal fabrication[6]). Given technological constraints and limited affordability, smaller firms may not have been able to use methods of educational upgrading and "credentialling" while at the same time facing reduced supplies of potential apprentices. Not surprisingly, small business organizations and their lobbying institutions have in recent years voiced concern over issues of deteriorating labour quality.[7]

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[5] In the past, clerical workers received apprentice-type training in order to become travel consultants. To the extent that the schooling sector does not provide requisite entry level skills but skills for higher supervisory positions within the same occupational clustre, firms may combine changed recruitment practices with a restructuring of the labour force; this in turn would increase the amount of segmentation of organization internal labour markets.

[6] See, N. Meltz, An Economic Analysis of Labour Shortages: The Case of Tool and Die Makers in Ontario (Toronto: Ontario Economic Council, 1982.

Employer interests in providing initial training should be fairly high where formal schooling cannot provide true alternatives, either because of the high intrinsic value of experience and training or because of low educational and career substitutabilities (and, hence, mobility) inherent in certain entry level skills. This is particularly true for many skills and trades in the construction industry, provided employers can recoup human investments through some of the manpower strategies outlined earlier.[8]

Interests in more firm-specific types of training including apprenticeship are probably most prevalent in many parts of the manufacturing sector, notably fabricating and processing industries where neither traditional "general-type apprenticeship training", nor a complete educational restructuring of the labour force have constituted viable manpower strategies.

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[7] See e.g., J. Bullock, Canadian Federation of Independent Business, Minutes and Proceedings of the Special Committee on Employment Opportunities for the Eighties, Issue No. 3, 1980, p. 3 ff.

[8] We find in the construction industry, for example, a tendency toward lower search costs through standardization of training and use of union hiring halls together with high differences between journeymen and apprentices' wages. There is, however, less firm-specific training and/or lengthening of training and job tenure, which in part is rendered impossible by the seasonality and cyclicality of the building industry.

This seems reflected in the many briefs submitted recently to the interparliamentary task force on employment in the eighties, urging the federal government to provide more support for company-sponsored (e.g. non-certified) forms of training. Also, many successful firms in the manufacturing sector conduct their own non-registered company apprenticeship training programmes.

Throughout all sectors, employer's perceptions about the viability of training in general and apprenticeship training in particular will be conditioned by prior knowledge and/or expectations as to costs and benefits of apprenticeship training. One could hypothesize that those employers who in one way or another have themselves been exposed to this form of training system will be more interested in apprenticeship, everything else being held constant. The latter seems to be borne out by occasional surveys and results from personal interviews with many apprenticeship training directors, who invariably indicated that the percentage of apprenticeship training is higher in establishments where owners/managers have had European apprenticeship backgrounds.

Turning now to the key parameters underlying the individual worker's decision process with respect to the demand for more schooling and/or training, human capital theory has offered three somewhat interrelated explanations. According to its purest formulation, individuals maximize income (or more exactly utility) over a lifetime, which suggests that they will choose an optimal path of human capital accumulation, maximizing the highest attainable flow of learning, earning and leisure over their working life (Ben-Porath 1967, Heckman 1976, Rosen 1976). Given the existence and high levels of uncertainty about expected life time incomes (utilities) from choosing between different portfolios of schooling and post-schooling human investments, many researchers have introduced "peer patterns and role models" as alternate explanatory variables into the process of occupational choice and maximization of life time income or utility (see e.g. Polachek 1975). The third modification of human capital theory, and one which will be utilized in our empirical work, was pioneered by Richard Freeman (1975). In this approach, schooling and curricular choices are highly dependent upon the relative salary structure at or around the time at which the individual has to make career decisions. That is, individuals will enroll in particular programmes and/or schools if starting wages of "schooled" or "trained" occupations relative to "non-schooled/trained" occupations are sizeable and/or growing. As distinct from the life-cycle model such decision processes can give rise to cyclical swings in wage differentials and enrollments as has been observable in a number of occupations in the past. Ceteris paribus we would, therefore, expect a positive relationship between earnings differentials among career options (starting wages of journeymen minus starting wages of non-skilled workers and the level of enrollments in apprenticeship training.

2) Modifications of the Neo-classical Human Capital Model: Institutional Growthmanship of Education and Other Imperfections in the Education to Work Linkage

Long-run competitive equilibria in the neo-classical human capital model imply that individual workers will be optimally sorted in labour markets according to ability, schooling and experience and that they will undertake optimal amounts of human investments. Since returns to various forms of human capital must be equalized throughout, no market incentives exist to change such Pareto-optimal distributions in human cpaital (Mincer 1974, Rosen 1976). These assumptions of market transparency and -purity are not only non-tenable but, as will be shown below, education systems furthermore undergo programmatic changes of which only small fractions are linked in micrometer fashion to changes in the system of employment and the labour market.

Two aspects of the education-to-work linkage are of interest in the context of our concerns with the provision of vocational education and optimal resource allocation in industrial-type training in Canada:

1) How do educational institutions respond to changes in the employment system and the labour market? How is this response mechanism conditioned by particular educational philosophies and their adherence in educational

institutions, by the existence of alternative funding mechanisms (e.g. cost-sharing agreements between federal and provincial governments), by institutional rigidities in education in the form of personnel, capital or organizational constraints and/or by different institutional arrangements for programme control and evaluation such as training advisory boards, occupational training councils and the like. In short, how important are political and education-internal forces in shaping the system of education and its changes through time as opposed to determinants emanating from the labour market.

2) Provided that this transmission mechanism shows considerable imperfections how do employers adjust to institutional constraints with their hiring, training and promotion policies? In what way can changes in education affect employer preferences, particularly with respect to make or buy--training or hiring--decisions? Do manpower adjustments of employers compensate for market imperfections or do they reinforce them?

Both a priori reasoning and empirical evidence about the process of growth in education should help us develop and test hypotheses with respect to the behaviour of apprenticeship and other industrial-type training.

It is probably best to start the discussion of non-market determinants in education and their impact on the provision of vocational and industrial type training and education with a brief account of variations in basic education philosophies. How particular views of the world or philosophies in education, at times exemplified in a single leadership capacity in education, are apt to dominate the process and outcome of an entire education system, is well illustrated in Peterson' historical review of Ontario's apprenticeship training system,[8] in which he shows the secular swings in the emphasis for or against vocational and technical training to be a strict function of the prevailing philosophies in the respective departments of education of the province. If the prevalent philosophy at the time was based on the premise that general formal schooling was the best guarantor for gainful employment and that every citizen was both qualified and entitled to such an education, typically little was undertaken to either assess the needs of special vocational education or to provide it. Those apprenticeship training programmes which were carried over from the past tended to become quickly submerged under suffocating guidelines and controls from educationists in general education who often managed to quickly reduce the number of programmes and training places. Linkages between education and the market place in the form of advisory councils were often discontinued in favour of more direct controls through education ministries, and incentives were generally set so as to attract a maximum number of students into the academic stream of secondary and tertiary education. Contrary, if the need for more occupation-specific training was perceived on a priori grounds, special institutional arrangements were created in order to better assess training needs and to cater for new and innovative approaches towards the provision of technical/vocational training and education. Often as a result of such changes in philosophy, vocational education, particularly apprenticeship training, was placed under the control of the provincial departments of labour and provided with additional evaluation- and counselling functions such as apprenticeship training boards or trade advisory councils. Such major shifts in education policies not only occurred in Ontario but also apply to other provinces even though the timing has not always been the same across the country. In correlating policy shifts with actual changes in the provision of technical training such as apprenticeship it has to be further pointed out that past efforts of government to expand formal schooling are not always completely reversible, for existing facilities and faculties tend to display a certain amount of discretion over both the market place and educational authorities of provincial bureaucracies. Hence, we face two other important imperfections in the linkages between employment-and education system "Institutional Inertia and Institutional Growthmanship in Education." Both of these two forces can prove rather resistant to changes in the overall demand for worker qualifications, and their long-term survival can be administered through appropriate control, evaluation and funding schemes in education. Those familiar with educational institutions can easily attest to the dynamic self-perpetuation of educational supplies and- bureaucracies. For limited career mobilities of educationists and/or lack of promotional flexibilities within the system of education can create a breeding ground for diversification in special programmes, schools and departments whenever funding is rendered easy, thereby increasing the overall career mobility within the system. Canadian case histories with respect to the forementioned patterns of institutional growthmanship[9] abound at all levels of formal education. Provincial records are however most impressive with respect to the expansion of formal schooling in the late sixties and seventies. The Federal Government's involvement in the provision of technical education through TVTA and AOTA appears to have further strengthened the provinces' trend towards institutionalization of all education and training even though this was not intended by legislation. Of particular relevance were first of all the massive building projects for technical education facilities and the development of new technical schools and technical departments in comprehensive high schools at the secondary level in the early sixties. The central idea for this expansion was to provide pre-employment courses and training in occupation-specific skills in institutions rather than through initial training in employment. The expansion was largely facilitated through the passage of TVTA which promised substantial federal funds to promote technical education in the provinces.[10] At that time, federal intervention was fuelled by the recommendations of the Royal Commission on Canada's Economic Prospects, which urged for an expansion of institutional technical education across Canada and which confirmed pessimistic provincial reports on the prospects of apprenticeship training as a viable alternative for skill acquisition.[11] The second massive move towards institutionalization of initial training came through the creation of community colleges in the mid-sixties which was in part inspired by a recognition of the failures of the comprehensive high school system, which seemed to have neither provided sufficient entry level skills for a large number of skilled worker occupations nor provided avenues for further education and training.

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[8] Peterson, R., A brief history of apprenticeship in Ontario: 1977-1974 in: Elements of Technology, February May and September issues 1974.

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[9] Institutional growthmanship in Canadian vocational education is defined here as the formalization of initial training and its proliferation and aggrandizement by tertiary institutions.

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[10] TVTA essentially increased the 50% grants on capital expenditure under the old Vocational Coordination Act to 75%.

[11] Those reports originated in the main from Hawes and Kidd, both former directors of the Ontario Apprenticeship Training Branch.

In some provinces, the introduction of community colleges led to a complete reorganization of all programmes in the fields of vocational, technological, and recreational education within one system of colleges of applied arts and technology. Not all provinces though established a community college system and those which did, did so at different points in time. Also wide inter-provincial differences remained with respect to forms and levels of technical education provided by the new colleges and with its relationship to the overall structure of technical/ vocational education programmes in a given province. E.g., all existing institutes of technology, vocational centres and institutes of trade in Ontario were incorporated into the new college system, with apprenticeship training being recognized as the lowest form of training and education in which a post-secondary institute was to be engaged and with colleges occupying an intermediate level of education somewhere between high school and university.[12] In other provinces, coordination was carried out more disjointly with individual technical institutes often remaining independent or being only loosely controlled within a system of consultation. Generally speaking, it is however fair to interpret these institutional changes as a gradual takeover of technical/vocational training and education by "educationists" who either in their capacities within the college system or within provincial departments of education began to control apprenticeship and industrial-type training both through funding and by means of programme evaluation and specification of curricula. Despite such secular developments which to a greater or lesser degree occurred in all provinces, great variations in programme emphasis and delivery remained with e.g., Alberta concentrating much more on spending federal funds in the field of apprenticeship training while other provinces preferred to be more heavily involved in pre-employment skill training and/or retraining of adults.[13] As with TVTA, its follower, the AOT Act, again greatly facilitated the expansion of capacity utilization of institutionalized vocational and technical training, this time through the college system. Institutional growthmanship was here nurtured by two basic forces. First of all, there was the self-interest of those who were in charge of institutionalized training and who, in the absence of an industrial logic as a meaningful mechanism of budgetary control, were able to preserve and expand programmes beyond levels of social efficiency.[14] Secondly, a number of provinces were eager to preserve their educational authorities in matters of manpower training and act as the exclusive broker vis-a-vis the federal government in the purchase of training seats,[15] which in turn introduced and/or prolonged capacity constraints of educational institutions. While institutional growthmanship cannot be without its limits and while market pressures will eventually lead to re-alignments in provincial systems of education such as is observable at present[16], it has in the meantime influenced past distributions of skill acquisition methods and has a bearing on the formation of hypotheses with respect to past behaviour of employer-centered forms of initial training such as apprenticeship. In particular, the following observations can be made:

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[12] It should be noted that there are great inter-college variations in the level and content of technical education within Ontario. The same is true for some other provinces.

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[13] For an interprovincial comparison of training activities funded by the federal government, see: Department of Employment and Immigration, Interdepartmental Evaluation Study of the Canada Manpower Training Programme: Technical Report, May 1977, p. 37.

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[14] A number of empirical investigations have documented the inefficient allocation of resources between institutional and employer-centered forms of vocational training, see e.g.: Newton, K., Institutional versus On-the-job Training: Some Canadian Evidence, Int. Journ. of Social Economics, Vol. 3, No. l, 1976, pp. 24-38.

Mehmet, O., Efficient Allocation of Public Resources in Manpower Training, Socio-economic Planning Sciences, Vol. 5, 1971, pp. 295-306.

Mehmet, O., Evaluation of Institutional and On-the-Job Manpower Training in Ontario, Can. Journ. of Econ., Vol. IV, No. 3, August 1971, pp. 362-73.

Maki, D., An Evaluation of Canadian Federal Manpower Policies: Training and Job Creation 1970-78, Study paper (Ottawa: Economic Council of Canada, 1978).

[15] A good description of federal-provincial conflicts and the provinces' strategic posturing with respect to the provision and execution of vocational training and education can be found in: Dupré, S., Cameron, D., McKechnie, G. and Rotenberg, T., Federalism and Policy Development: The Case of Occupational Training in Ontario (Toronto: University of Toronto Press, 1973).

See also: Federal Provincial Conference, Ottawa, October 1966, pp. 14-16.

Glendenning, D., A Review of Federal Legislation Relating to Technical and Vocational Education in Canada (Ottawa: Dept. of Manpower and Immigration, 1968.

1) There is evidence that the provinces have overexpanded formalized training in the sixties and seventies in order to fully exploit federal cost-sharing and grant schemes in manpower under both the TVTA and AOTA, (e.g. Newton 1976) which implies that:

    a) the acquisition of occupational skills became more heavily subsidized in the educational setting as compared to the work setting, which in turn must have also meant a cheaper option for the trainee whenever he/she had a perfect choice with respect to availability of places and conditions of access. Even where the choice may not have been a perfect one, trainees might still have preferred the educational setting over the work setting by choosing a related or substitute field of qualification on account of this subsidization.[17] As long as subsidization of institutionalized training ensures high private returns employers too would show a tendency to shift the burden of general long-term training from themselves (and their trainees) onto publicly-financed institutions such as universities, CAATs and full-time vocational institutes even though training may pay for itself.

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[16] Most provinces are presently attempting to reallocate resources away from general into occupation specific forms of schooling and training.

b) Institutionalized forms of training and schooling are far more difficult to adjust to market trends relative to apprenticeship and other employer-centered forms of training. This is not so much the result of some natural technological constraints inherent in institutionalized learning but rather due to some deliberate design choices in education. Substantial interprovincial variations notwithstanding, apprenticeship training as a rule tends to be much more tightly controlled both with respect to curriculum development (often achieved through training advisory boards) as well as with respect to more direct and flexible budget controls aided largely by contractual appointments of teaching staff. The majority of faculty and teaching staff in institutions and programmes not providing apprenticeship training on the other hand are tenured, their job security is often highly protected by unions, budgetary controls over specific programmes or fields of qualification are in this setting rather muted,[18] and there tends to be, furthermore, far fewer decision-making input from the employment sector.

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[17] If provinces could not place individuals in particular skill programmes, they transferred them into those programmes for which excess capacities in colleges or public schools existed. Such uneven capacity constraints across specific programmes further impeded allocative efficiencies. Institutionally biased counselling towards these programmes had the same effect.

2) Employer practices and norms of trainee selection is another area where systematic institutionalization has affected employers' willingness to train apprentices. For a secular percentage rise in enrollments of post-secondary formal schooling leaves employers with a smaller

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[18] A case in point is e.g., the allocation of budgets within universities following recent cutbacks in university financing in Ontario, Quebec and British Columbia. For allocation decisions in universities often depend on majorities within the senate or other such self-governing bodies, which has meant that liberal arts programmes have been cut far less and professional faculties have grown far less than what would have been warranted under adherence to demand-oriented entitlement formulas.

pool of potential applicants for apprenticeship training and, hence, with less scope for screening. If the quality of applicants in the dwindling human resource pool were at the same time declining,[19] apprenticeship training would become more costly in terms of higher search and training costs and/or lower post-training productivities or both. As shown earlier in the pure human capital model employers will adjust to such a situation with short or long-run strategies depending on whether they interpret these changes to be permanent or only transitory.

Given the forementioned institutional considerations apprenticeship training should be effected in the following ways:

1) On account of the observed biases towards formal schooling and the existence of institutional inertia, we would expect a very sluggish and lagged response by provincial education systems in the provision of apprenticeship training e.g., specific occupational shortages would exist for quite some time before new trades were designated or new programmes established; on the other hand,

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[19] This appears to be the opinion most often expressed by employers when asked about reasons for the failures of apprenticeship training, for a reference see e.g.: The conference proceedings of the conference on "Skills for Jobs", Ontario Government, Manpower Secretariat, Toronto, 1978.

temporary declines in the demand for existing apprenticeship places will trigger stronger and faster cutbacks compared to programmes of formal schooling. This is apprenticeship programmes are slow in developing but fast in disappearing.

2) The most likely effects of secular increases in post-secondary full-time school enrollments of those aged 18-24 on apprenticeship training are to lower employers' interests in this form of initial training. Patterns and instruments of manpower adjustments will, however, vary appreciably across specific occupational clusters on account of differences in the substitutability of labour. We would expect the level of apprenticeship training to change the least in those occupations where formal schooling cannot substitute entirely for the practical experience and/or the on-the-job training component of apprenticeship and where existing technologies prevent other forms of skill substitution. This is e.g., true for many building trades. If faced with long-term occupational shortages and/or excessive employment costs in these critical trades employers are likely to search for and introduce new and less skill intensive technologies and products such as e.g. prefabricated building materials rather than search for different patterns of training and/or labour allocation. Employers may, furthermore, alter age and

qualification requirements for apprenticeship training if they believe that increased educational opportunities have led to a quality deterioration among those applying for apprenticeship training. In order to lower the risks/costs of human investments, firms will either raise educational requirements for apprentices (use education as a cheap screening device) or indenture only workers who have been previously screened through observation on-the-job by the firm providing training.[20] For the majority of white collar and service occupations where large amounts of on-the-job training and experience do not constitute absolute entry barriers we would hypothesize that institutionalized training both in the form of full-time schooling or institutional manpower training by governments has increased and replaced apprenticeship or other forms of employer-centered initial training. To the extent that in the past, many of these occupations were not considered apprenticeable in the first place, there will now be even fewer incentives to develop apprenticeship training schemes in these occupations. Whenever apprenticeship related elements cannot be reproduced or transcended (simulated) in classroom instruction such as is e.g., true for such elements as safety behaviour, entrepreneurship, etc. this may lead to the creation of cooperative education or career education programmes such as is observable both here and in the U.S. From a secular perspective though, we would hypothesize that employers have opted for higher educational qualifications in order to minimize search and training costs particularly where pools of more generally educated labour with few career alternatives were available in ample supplies (e.g., women in the sixties and seventies).[21]

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[20] Our hypothesis about manpower adjustments in age and education requirements for apprenticeship training can be further refined by evaluating relative search/recruitment efficiencies of increased age (experience) versus additional years of schooling in different occupational settings. E.g., certain social qualifications such as work motivation, loyalty or ability to work in teams can probably be screened far more efficiently on-the-job while abilities to cope with more complex tasks and expected changes of such tasks on account of career substitution/mobility over a working life can be screened far more efficiently (less costly) with educational credentials. Given e.g., the relative greater importance of the former in occupations such as the building trades, we would, ceteris paribus, expect apprentices to to be older.

Hypotheses with respect to the behaviour of apprenticeship training in the manufacturing sectors are somewhat more ambiguous and should be presented at a more disaggregated level e.g., in the context of a particular occupational setting. The reason for this lies in the variability of technology and substitutability of labour within the manufacturing sector, which are key determinants in employers' hiring choices (between e.g., technical graduates or technologists and internally trained apprentices). Whenever apprenticeship training contains firm-specific elements, where training provides low cost screening for job- and firm-specific traits and abilities of employees and where skill substitution is limited to only one or few links in the training and promotion ladders of the firm's work force, we would expect employees to only make limited use of the expanded supply of CAATs or other technical graduates from tertiary institutions. On the other hand, where the opposite conditions hold true, we would find a greater secular expansion in the employment of technologists and other graduates from tertiary institutions, again holding all other factors constant.

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[21] The structuring of qualification in the organization internal labour market following such expansions of the education system must also have implications for the desirability of technological change. E.g., an oversupply of highly qualified and low priced clerical workers will e.g., slow the introduction of micro processors.

3) Bilateral Monopoly and Skill Bargains - The Unions' Interest In Training

In recent years, both labour economists and researchers in industrial relations have begun to analyze more thoroughly the interrelationships between the structure of jobs, tasks and employer training within the setting of firm-internal labour markets with a view to explaining both the nature of the employment relationships (Fox 1974, Williamson 1975, Edwards 1979) and the embedded role of unions (Hirschman 1971, Freeman and Medoff 1979).

Given that on-the-job training and other specificities create shared rents, unions understandably will be ambiguous with respect to their support for different employer-centered training alternatives. All forms of training create potential for advancement, higher pay and greater job security for those undergoing training, all of which effects will be in the broader interests of union members. Hence, unions can rarely be categorically opposed to training per se, even where it is very firm-specific. Firm-specific training, furthermore, increases the attachment of workers to firms and as such also enhances union interests by providing a more stable union membership. Specific training, however, can raise issues and conflicts with respect to the sharing of the net training benefits and unions may, therefore, want to influence employers' training decisions. Depending on the strength of unions' own competing goals and their bargaining power, they can respond to issues of control over training with either of the following strategies. Unions may press management to provide more general-type training such as apprenticeship which would lead to a disappearance of the shared monopoly rent, link the compensation of skilled workers more closely to the average pay in the market, and increase workers' mobility potential. Unions will likely pursue this strategy if:

a) they do not have to be concerned about highly skilled worker turnover either because of the unstable nature of employment in the industry (e.g. construction) or because membership is ascertained at the industry level (e.g. this could be achieved through industry wide bargaining and/or close union cooperation such as is true in steel and construction).

b) Skill training and acquisition of general skills does not invite and lead to management strategies to substitute semiskilled and unskilled labour for general skills, which hinges on both production technology and elasticity of labour demand together with unions' abilities to control (fine tune) skilled labour supplies. Hence, wherever compulsory certification and registration does not pose threats or jurisdictional overlap on the union side and of labour substitution on the part of management such as is again true for most building trades, unions are likely to press for regulated and standardized general-type apprenticeship training.

c) General-type training programmes already exist, which can facilitate and/or use union involvement such as is true for trade councils or training advisory boards attached to most provincial apprenticeship training systems. Unions may of course use these councils or intermediaries to press for the designation of new trades and training programmes. Given the political and consensual nature of the trade designation process and its extreme variation and independence across provinces unions will, however, very carefully consider such constraint before attempting radical departures from past practices and breaking new grounds.[22]

Whenever and wherever such conditions do not prevail, unions' interests in training will shift from a preoccupation with the nature and quantity of firm-internal skill production to concerns over the distribution of training benefits to union members e.g., to the sharing in the monopoly rent. As

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[22] Nonexistence of a broadly based and universal apprenticeship training system in Canada explains e.g., the much smaller involvement of Canadian unions in reform endeavour with respect to vocational education.

opposed to outright control or negotiation of specific training/promotion and earnings sequences, North American unions appear to have found it much more in their political and economic interests to control job- and promotion ladders and have management arrange training within those constraints.[23] Certainly, there is some factual and circumstantial evidence to suggest that this has taken place in large segments of the Canadian corporate sector. The prevalence of firm-specific (as opposed to general-type) training in the Canadian economy is not only revealed by most surveys on training in industry[24] but can equally be gathered from studying the Canadian dictionary of occupational titles[25] which shows an amazing diversification of industry specific skills within otherwise homogenous groups despite almost identical educational and similar job requirements (e.g., observable within the four-digit Canadian occupational code). In support of the previous arguments, one also finds as a rule few specific-training policies and -procedures spelled out in Canadian collective agreements.[26] With the exception of the now no longer affiliated construction unions, the CLC has until recently produced very little in terms of broader policy perspectives on industrial- and apprenticeship training. In the face of the momentarily heightened skilled worker shortages and the growing public debate on alternatives of skill formation in blue collar occupations, the Canadian Labor Congress has of late submitted a brief to strongly support the British levy/grant system.[27] Again, the document appears to be consistent with the previous analysis of union interests in firm-specific training, for it almost exclusively emphasizes lack of financing in skill training and negative externalities as the underlying causes of the present imbalance. Furthermore, if quality of training and/or choices of general- versus firm-specific training had been key issues, we would observe a much more common approach to apprentice/journeymen ratios than what is found in practice where extreme variability of these ratios even within the same industry can be found.

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[23] No direct measure of unions' apathy vis-a-vis training in North America is available; in making the claim we refer here to discussions of comparative union policies and union pronouncements in industrialized countries (e.g. Dunlop 1958, Barbash 1972, Sturmthal & Scoville 1973, Shalev 1981).

[24] See e.g., Statistics Canada, Organized in Service Training in Four Major Industries 1963 (Ottawa, 1965).

Statistics Canada, Organized Training in Four Industry Groups 1965 (Ottawa, 1965).

Statistics Canada, Training in Industry 1969-70 (Ottawa, 1971).

Ontario Department of Labour, Industry Sponsored Training Programmes (Toronto, 1973).

[25] Canadian Classification Dictionary of Occupations, Vol. I and II, Department of Manpower and Immigration (Ottawa, 1971).

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[26] A recent sampling of 70 collective agreements in Canada by the author in 1980 showed only 11 or 15% with a training clause, while a recent Labour Canada analysis of training positions in larger bargaining units arrives at a somewhat higher figure of 20%, which is however still low in international perspective.

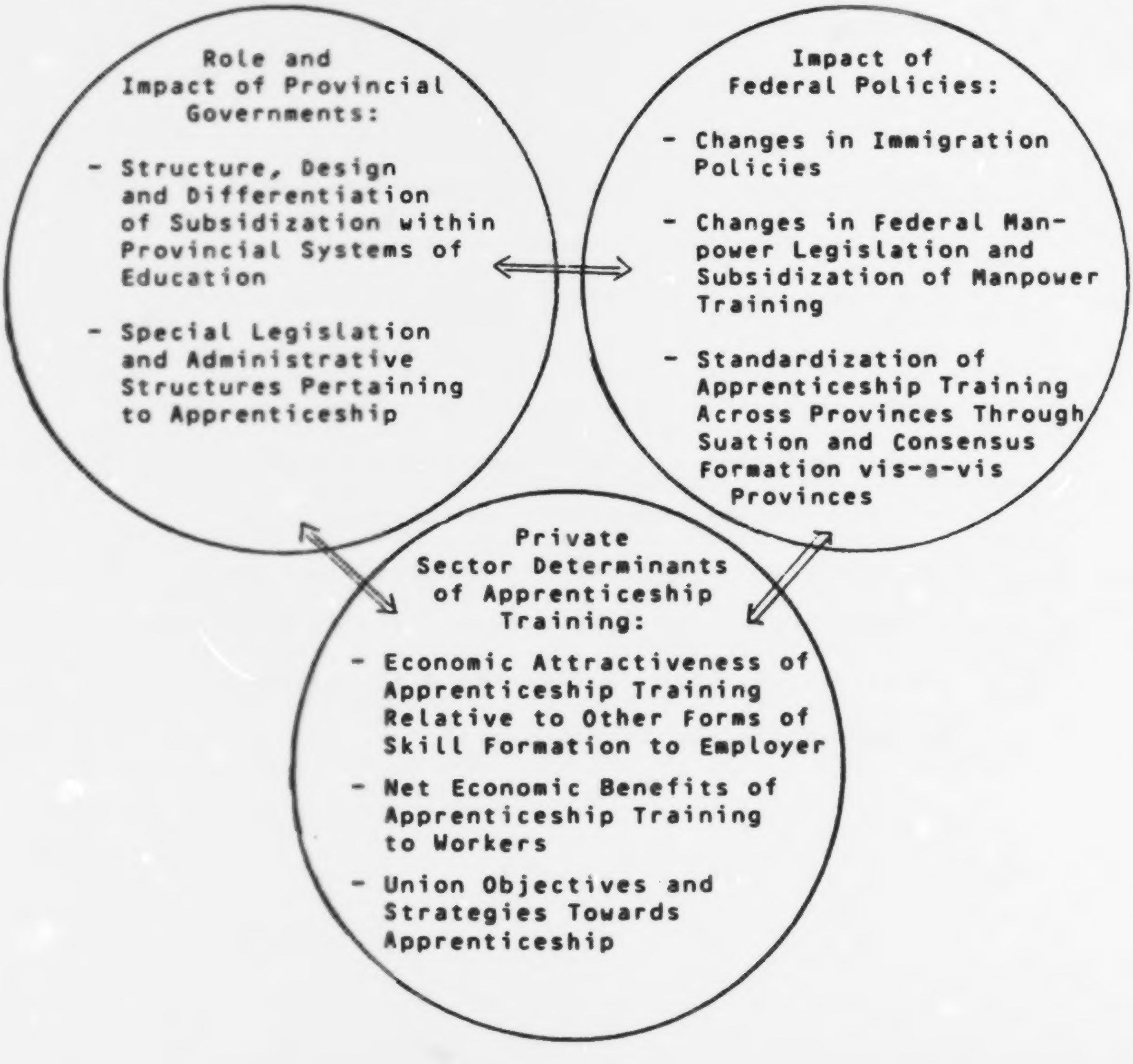
[27] Canadian Labour Congress, Brief to the Allmand Task Force on "Employment Opportunities for the Eighties", Ottawa, February 1981.

CHAPTER IV

Economic Determinants of Apprenticeship Training: Empirical Results

Previous chapters gave an account of the historical development of apprenticeship training and contoured the economic, political and institutional factors and determinants which were hypothesized to have shaped the present state of apprenticeship training in Canada. In this section, a modest attempt is made to throw empirical light on some of the questions and hypotheses raised earlier.

In schematic summary, the following interrelated fields and variables of impact were discerned:



Role and Impact of Provincial Governments:

- Structure, Design and Differentiation of Subsidization within Provincial Systems of Education
- Special Legislation and Administrative Structures Pertaining to Apprenticeship

Impact of Federal Policies:

- Changes in Immigration Policies
- Changes in Federal Manpower Legislation and Subsidization of Manpower Training
- Standardization of Apprenticeship Training Across Provinces Through Suation and Consensus Formation vis-a-vis Provinces

Private Sector Determinants of Apprenticeship Training:

- Economic Attractiveness of Apprenticeship Training Relative to Other Forms of Skill Formation to Employer
- Net Economic Benefits of Apprenticeship Training to Workers
- Union Objectives and Strategies Towards Apprenticeship

Our main hypotheses to be tested are, therefore, concerned with the responsiveness of apprenticeship enrolment to economic incentives, particularly, as regards wage differentials between fully skilled journeymen and unskilled workers and to explore the conditioning influence of particular institutional arrangements and federal and provincial policies. With respect to the latter, the following questions arise:

- What has been the impact of federal training schemes and subsidies on apprenticeship levels and how has it affected particular programmes?
- To what extent has the development of alternate skill supplies, notably, immigration of fully skilled workers and the student output from formal technical education affected enrolment in apprenticeship?
- Are there any differences in the enrolment behaviour between programmes with alternate administrative and institutional arrangements such as the provision of interprovincial standard exams (SEAL) and the provisions of licensing and specific regulations?
- Are there any difference in the behaviour among specific occupations and apprenticeship training programmes, particularly, when considering differences in the cost of apprenticeship to employers?

Given the absolute lack of time series data for some phenomena such as employers' cost of apprenticeship training, the availability of only partial time series data for other variables such as levels of wages and immigration, and existing difficulties in translating often amorphous and qualitative configurations of provincial training systems into simple quantitative indicators, many of the tests, analyses and conclusions had to be based on indirect inferences drawn from pooled data or group comparisons derived from particular provinces and trade categories.

1) The Data Base

We chose apprenticeship registrations in all of the provincially designated trades for the period 1961 to 1979-80 for all provinces and territories as our primary dependent variable. Since one of the main objectives of the study was to evaluate the responsiveness of the apprenticeship training system to market forces and government policies, new annual registrations in apprenticeship training programmes appear as a suitable dependent variable provided no secular changes of attrition in apprenticeship training have occurred. The latter did not materialize as was evident from the behaviour of apprenticeship cancellations, another statistic which together with apprenticeship completions, was collected for the same period 1961-79/80. The registration data contain apprenticeship training programmes with and without interprovincial standard examinations (Red Seal Programme), which allows us to also group the data according to this characteristic.

Data on wages for skilled workers and other observations relevant to apprenticeship training, are normally recorded on the basis of occupation. In a second step, the raw data was, therefore, coded according to a four digit CCDO classification. A third grouping into three broad trades categories, e.g., Construction, Services, and Manufacturing, was arranged subsequently. Apprenticeship registrations, the dependent variable was, therefore, available in the form of the originally recorded 65 different training programmes (20 with and 45 without interprovincial standards examination); in the form of registrations recorded in 36 apprenticeable occupations; or as registrations in group sector breakdowns (13 Construction trades, 9 Service Trades and 14 Manufacturing Trades). On the basis of the same 4 digit CCDO code wages for fully-skilled workers and unskilled non-production labour were obtained using unpublished wage data from the Federal Department of Labour Series: Wage Rates, Salaries and Hours of Work, supplemented by wage statistics published by provincial Departments of Labour and data provided by provincial construction labour relations associations. Not all data sources covered the same length of period, and hence, the lowest common time series denominator permitting an analysis of all apprenticeship training in all provinces had to be adopted. This resulted in a coverage of the period 1971-1979.

On account of changes in occupational classification codes and data retrieval difficulties, the Department of Employment and Immigration was able to provide unpublished data on immigration of skilled workers by province of designation using the same 4 digit CCDO code for the period 1973-80 only.

In order to evaluate the relative importance of general and occupation-specific conditions of labour demand upon apprenticeship training, three sets of demand indicators were utilized. The first were unpublished quarterly vacancy data from the job vacancy survey covering our 36 apprenticeable occupations at the 4 digit CCDO level from 1971 to 1978. The second source was the composite of leading indicators, a monthly series published by Singer Associates which was available from 1961 to the present and finally, since a large number of apprenticeable occupations are in the construction industry, Dwelling Starts, another monthly series available from 1961 to the present was used. All monthly and quarterly series were subsequently converted as moving averages into annual figures in order to match them to our annually reported apprenticeship registrations. The data base in schematic overview looked as follows:

Data Base for Regression Analysis

Dependent Variable

1) Annual Apprenticeship Registrations, Cancellations and Completions (Stat. Canada)

   Coded as 4-digit CCDO Code (1960-1980)

2) Split Samples
   - provincial registrations
   - registrations in specific sectors (manufacturing, services, construction)
   - registrations in compulsory and non-compulsory programmes
   - registrations in occupations with high and low apprentice/journeyman ratios
   - registrations in high and low cost training programmes in Ontario and Alberta
   - registrations in RED SEAL programmes

3) Annual Percentage Growth of Apprenticeship Registrations

Independent Variable

1) Average hourly occupational wages (at 4-digit CCDO level) by province, Department of Labour, unpublished, 1971-1980.

2) Annual level of immigration in apprenticeable occupations (at 4-digit CCDO Code) by province, Statistics Canada, special tabulations, 1973-1980.

3) Composite of 10 coincident indicatures based on Stat. Canada Data, compiled and published by J.J. Singer, Ltd. (monthly series), 1961-1980.

4) Housing Starts (all areas), Statistics Canada (monthly series), 1962-1980.

5) Time
   t_1 = 1960-61 to t_{20} = 1979-80

6) Policy
   Dummy variable for periods after 1972 and 1978 (introduction of specific training legislation).

2) Empirical Results

A) Responsiveness of apprenticeship training to varying market conditions

A first impression of both the cyclical and secular elements in Canadian apprenticeship training can be gained by simultaneously graphing different output measures of the apprenticeship training system e.g., apprenticeship registrations, -cancellations, and -completions against market indicators or market signals such as the composite of coincident indicators, dwelling starts, and average annual vacancy levels in apprenticeable occupations (see Figures 1 to 5). As can be seen from Figure 1, from a secular perspective, apprenticeship registrations appear to have risen moderately through the earlier part of the sixties, then declined in both absolute and relative terms between 1967 and 1971, after which they appear to increase again at a somewhat higher plateau.

When comparing apprenticeship training registration with the composite coincident indicator series in Figure 1, it appears that the former show a lag of approximately 1 period (1 year) and, secondly, that the amplitudes of the registration cycles have become stronger over more recent years than was true for the sixties or early seventies. Reported discontinuations or cancellations of apprenticeship training contracts, a good indicator of attrition in apprenticeship training, similarly follow business conditions, although in a more muted fashion. Hence, while the apprenticeship training system behaves in a cyclical fashion by registering apprentices during the improving of business conditions and releasing them during recessions, a tendency appears to have developed in the seventies to maintain employment for first year and second year apprentices, as is apparent from the much milder swings of discontinuations compared to registrations.[1]

As can be seen from Figure 4, there is a somewhat weaker association between initial enrolment in apprenticeship and vacancy levels in apprenticeable occupations for the period for which job vacancy data were available e.g., 1971 to 1978.

The greater sensitivity of apprenticeship enrolment to general business conditions rather than reported vacancy levels indirectly suggests that employer initiatives in the training and employment of apprentices due to shortages may be a less important adjustment mechanism.[2]

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[1] Although apprenticeship discontinuations are not synonymous with unemployment of apprentices, it is one of the prime reasons for attrition, see for example:

J.Bernier, L'apprentissage au Quebec,Facteurs d'adhesion et facteurs d'abandon, Laval, 1972, p. 21.

See also:

Provincial Apprenticeship Boards, Annual Reports and Statistics.

As can be expected, there is extreme variability in the correlation between cycle indicators or vacancy levels and apprenticeship registrations across particular trades (or groups of trades) as well as across provinces. Among programmes most responsive to general business conditions (showing correlation coefficients of more than .7) are all of the mechanical and automotive trades and some specific apprenticeable occupations such as carpenters and cabinet makers, gasfitters, glaziers, iron workers and tile setters. Vacancy levels show generally very little association with apprenticeship training registrations, and only when fitting appropriate lags do we find significant correlation (above .7) with pipe fitters, tile setters, barbers/hairdressers and electrical equipment installers. A common denominator of the latter group is that they all represent well-established apprenticeship programmes which have been in existence since apprenticeship training started in most provinces, and that most of them fall into maintenance/service occupations. At the other extreme, it was found that apprenticeship training in manufacturing trades (e.g., machining trades) as well as the more specialized and relatively younger industrial trades (e.g., refrigeration and air conditioning mechanics, industrial instrument mechanics) display only small or even negative correlations with general business condition indicators.

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[2] This observation is consistent with findings in a number of recent surveys which have shown that increases in apprenticeship training is but one, and often not the most important, adjustment mechanism open to firms to resolve labour market shortages. See:

Economic Council of Canada, Human Resource Survey (Ottawa: ECC, 1981).

If it can be assumed that the national composite of leading indicators represents a fair measure of business conditions for all provinces, one can evaluate the responsiveness of provincial apprenticeship training systems by comparing correlations between provincial registrations and cycle indicators. Alberta appears here as the most responsive provincial apprenticeship training system in that registrations in over 30% of its apprenticeship programmes are strongly correlated with business cycle indicators, (.7 or above), followed by Ontario (20%), and Nova Scotia (12%). All other provinces show less than 10%, with B.C. forming the bottom at 3%.

The cyclical character of the apprenticeship system, both in terms of the impact of the business cycle upon service trades, and the construction and housing cycles upon construction trades, poses a number of interrelated questions with regard to the long-term adaptability and stability of apprenticeship-type training in relation to the employment system. As is apparent from

Figure 1, cyclical variations in the intake (registrations), at least in the aggregate, do not translate into equally cyclical variations of output in the form of fully skilled journeymen. In part this is due to the fact that different apprenticeship training programmes vary in length of training anywhere between two to five years, with a median of three years. Hence, apprenticeship completions should behave like a three-year moving average of the registration cycle.[3] More importantly, however, there may be other factors which mitigate cyclical swings in apprenticeship completions, such as lay-offs of apprentices during business down-turns and other forms of attrition. It would therefore be interesting to know how employers rearrange training and worker skills over the business cycle (e.g., do they substitute cheaper apprentices for journeymen, or third year apprentices for first year apprentices, or do union rules and work permits result in the laying-off of those last in?). How does, furthermore, unemployment during apprenticeship affect individual workers; further training and career decisions and mobility patterns? Obviously, answers to these questions would bring us a step closer towards an understanding as to whether apprenticeship training programmes contain stable, converging or destabilizing cobwebs and as such should help us better model interactions between training flows and skilled manpower stocks. Some albeit very limited insights can be obtained through special cross-tabulations of apprenticeship contract cancellations from apprenticeship training statistics gathered by the Interprovincial Standards Committee and through simulations with the registration and completion time series data.

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[3] As can be seen by visual inspection of the completion curve in Figure 1, our underlying data appear to behave in this fashion.

As can be seen from Table 9, among the five reporting provinces, between 30% and 60% of apprenticeship contract cancellations constitute first year apprentices. However, this does not provide conclusive evidence of either the substitution of third for first year apprentices or even for a high incidence of unemployment among first year apprentices. Nevertheless, the data makes it more likely that there is a higher probability of movement in and out of employment and apprenticeship among first year apprentices. Further evidence to support this conclusion can be found in some of the surveys and follow-ups which have been undertaken by provincial government departments.[4] There is furthermore variability across different trades and groups of trades suggesting differences in potential cyclical unemployment among apprentices. Such evidence can be gathered by correlating apprenticeship registrations in occupation j in year t with actual apprenticeship completions in year t + s, where s represents the normal or average length of training in occupation j. High correlation coefficients would indicate low attrition and/or unemployment among apprentices. In executing such correlations for a number of occupations which display similarity in length of training throughout all provincial jurisdictions, we arrived at the results, shown in Table 10. As can be seen, correlation coefficients are generally higher for four-year programmes than for three-year programmes. They appear higher for manufacturing trades than for construction or service trades and they tend also to be higher for those occupational categories, which in 1979 (the only year for which statistics were available) showed lower rates of attrition in terms of contract cancellations.

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[4] See for example:

Follow-up studies on apprenticeship training in Saskatchewan, Manitoba, and Ontario.

For Quebec, see:

J. Bernier, op. cit.

Average unemployment during apprenticeship could in some apprenticeable occupations be approximated by finding the optimal lag between registrations and completions (e.g., the one which maximizes the correlation coefficient R) from which the average length of training is subsequently subtracted. In so doing, we find that most construction trades show improved correlation coefficients when lags are stretched beyond the required length of training (e.g., in the case of painters and wallhangers, carpenters and roofers, delaying apprenticeship completions statistically by one year, increases correlation coefficients e.g., to .84, .63 and .85, respectively). On the other hand, the same experimentation leads to absolutely no improvement in correlation coefficients in such occupational groupings as tool and die making, construction electricians, motor vehicle repairing and industrial mechanics. The latter suggests that other factors such as variations in accreditation, curricular mobility within apprenticeship training (e.g., movements between construction and industrial electrician training) and other attrition must account for these results. The general question as to the causes, extent, and consequences of cyclical variations in unemployment among apprentices can, therefore, only be addressed in a meaningful way on an occupation by occupation or training by training basis. Without available time series data on either attrition or unemployment rates among apprentices, our conclusions must be formed tentatively, based as it is on fragmentary evidence. The following emerges:

1) Attrition tends to be higher among shorter duration/

lower quality training programmes. This can be rationalized both in terms of demand and supply forces. Lower quality training and resulting skills can be easily substituted for by unskilled and semiskilled labour thereby tempting both employers and apprentices into contract cancellations and/or lay-offs. On the other hand, longer duration/higher quality training programmes require a certain amount of risk-taking on the part of the apprentice, implying self selection processes among apprentices going into these training programmes. A less risk-averse individual is likely to endure more or longer spells of unemployment as part of the process of becoming a fully skilled worker. Also, lower quality training programmes are likely to yield lower prospective earnings in the jobs to which they relate.

2) Higher risks of human investment because of either greater skill specialization in long apprenticeship training programmes or higher probabilities of unemployment during apprenticeship require sufficiently high compensating returns in terms of wage differentials between fully skilled and semiskilled work. The greater responsiveness of apprenticeship enrolment in construction despite high attrition and unemployment rates compared to, for example, similarly long and risky training programmes in manufacturing, may, in part, be explain by the existence of sufficiently large wage differentials in construction, a point which will be taken up later.

3) While the observed registration and discontinuation cycles over the period 1961 to 1980 do not appear to have produced structural maladjustments and chronic shortages in terms of aggregate apprenticeship completions, such maladjustments may nevertheless exist in specific occupational settings, where cyclical behaviour coincides with high risks of human investments and low wage differentials between skilled and unskilled work.

B) The Relative Contribution of Economic Determinants: Wage Differentials, Immigration, Level of Economic Activity and Government Support Programmes.

The Adult Occupational Training Act was amended in 1971-72 through a number of measures which allowed the Federal government to more directly support and promote apprenticeship training.[5] A second major policy change in support of apprenticeship was mounted during 1978 through the creation of the Critical Trade Skills Training Programme (CTST).[6]

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[5] This data marks the Federal Government's shift away from purely institutionalized training to industrial training through the creation of CMITP, reimbursement of the provinces for the costs associated with the institutionalized portion of apprenticeship training, changes in eligibility for training allowances to also include apprenticeship, and the purchase of pre-employment training seats in trade skills from the provinces.

While, ideally, one would want to test for the relative success of the federal government's involvement in apprenticeship training by measuring the policy impact under the simultaneous influence of the other major economic determinants, such an undertaking was not feasible given the nature of our data base, which lacked wage differentials and skilled worker immigration data at the 4 digit CCDO classification for the entire period of the sixties. As to the Critical Trades Skill Training Programme, only two years of policy impact could be analyzed. We, therefore, chose to measure the effect of the 1971-72 and 1978 policy changes by assessing their statistical importance in relation to the underlying secular trends in all apprenticeship registrations, in major groupings and in the critical skill trades.

As can be seen from Table 11 and inspection of Figure 1, the policy change which in the regression equation was entered as a dummy variable representing the period from 1972 onward, shows a statistically significant upward shift of enrolment after 1972. Caution has to be, however, exercised in interpreting the policy impact given the low R^2 and absence of other relevant variables in the regression. More interesting are the results obtained by splitting apprenticeship registrations into construction, service, and manufacturing trades. For now, we can detect a far greater and more significant impact of federal training support policies upon construction trades, relative to service sector occupations, and more so apprenticeship training in manufacturing. The latter observations are further confirmed in non-reported regression results for critical trade apprenticeship programmes using the 1978 policy change (CTST) as a shift parameter. For here too, the policy change parameter did not appear sizable and statistically significant. Taken at face value, the results suggest that federal policies were successful where well-established traditions, institutional arrangements and programmes were already in place such as is true for construction trades, but were unsuccessful in initiating new programmes of industrial apprenticeship for which tradition did not exist. This is in line with contentions and hypotheses, which were made earlier in the discussion of discontinuations of apprenticeship training and training quality.

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[6] This programme was different from CMITP in that it only focussed on higher level trades and occupations in short supply, that maximum duration of support became extended to two years, employers were allowed to select their trainees and administration was generally kept simple.

With respect to measuring the simultaneous impact of immigration, wage differentials and level of economic activity, the analysis was restricted to data from 1973 to 1980, hence, all of the following regression results have to be interpreted in the light of these restrictions.

In looking at the first four regressions for Canada-total, and for construction, services, and manufacturing sector trades (Table 12), we first note the overriding importance of the wage differential parameter both in terms of its size and significance with the exception of manufacturing trades. Next we observe that cycle indicators either as lagged dwelling starts or coincident indicators are unimportant both with respect to the size and statistical significance in any of the regressions reported. Finally, and most surprisingly, skilled worker immigration in apprenticeable trades is highly significant throughout but unfortunately displays a positive sign, the opposite of what had been hypothesized earlier. The last observation warrants further comments. We maintain that employers prefer cheaper sources of skills acquisition relative to training such as hiring immigrant workers, hence, the hypothesized negative relationship between apprenticeship training and levels of immigration. There exists at the same time, however, a complementary relationship between immigration and apprenticeship training. To the extent that firms can only train if they have more skilled workers (journeymen) on payroll on account of specified apprentice/journeymen ratios, it can be argued that more immigration might also enhance more training. This would be particularly more important in those sectors which have a tradition of apprenticeship but show a temporary decline in the stock of available trainers (journeymen). Finally, the adjustments of the apprenticeship training system to changes in the availability of skilled worker immigrants probably is a very slow and long-term process interspersed by temporary successful attempts to secure off-shore workers through efforts of industry and government in particular sectors or trades.[7] Hence, a careful evaluation of the impact of alternative levels of immigration upon apprenticeship training is indeed rendered very difficult with the data base on hand. Therefore, at this point, firm conclusions cannot be formed. Longer time series would be needed in order to analyze more carefully the relationship between apprenticeship training and immigration.

In earlier discussions, a number of other institutional phenomena were hypothesized to either impede or promote apprenticeship training, notably, apprentice/journeymen ratios, forms of certification, and the development of the Red Seal programme. In order to test at least for the partial validity of arguments for or against certification, against high apprentice/journeymen ratios and/or a greater emphasis on the development of Red Seal programmes, regressions were arranged using the same variables which had been employed before but splitting the sample according to the above characteristics. That is, we formated a sample of apprenticeship registrations in all those trades in all provinces which required compulsory certification, with the remainder falling into the category of non-compulsory trades; secondly, we split the total population of apprenticeship registrations into two subsamples of apprenticeship programmes with either very low or very high apprentice/journeymen ratios and, thirdly, we examined a separate subsample of Red Seal training registrations (see Table 13).

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[7] For example, in 1979 there was a temporary surge of skilled worker immigration in a number of trades with critical shortages.

Looking first at the breakdown between apprenticeship training in compulsory and non-compulsory trades, we notice the marked difference in the two types of apprenticeship programmes with respect to response and sensitivity of training to market conditions. While training is responsive to wage differentials and the cycle of economic activity in both compulsory and non-compulsory trades, the coefficients in the latter are between one and two and a half times bigger in the case of trades with compulsory certification. Further, interesting results are attained by applying the same sample split to different provinces. As can be seen from Table 17, Ontario e.g., shows a more cyclical response of compulsory trades relative to Alberta and B.C. Generally, the Western provinces display smaller differences between compulsory and noncompulsory training, in British Columbia the relative size and significance of coefficients between compulsory and noncompulsory is even reversed. While on the demand side, one would expect compulsory training to be more responsive to cyclical conditions in the economy, we were surprised to also find larger supply responses to wage differentials. Possible explanations may center on the fact that many compulsory trades have existed for a long time, offering long-term employment security on account of low skill substitutability, even though cyclical unemployment within these trades tends to be higher.

The second group comparison centered on trades with either very high or very low apprenticeship/journeymen ratios. Using the Ellis Chart and provincial information on apprenticeship/journeyman ratios, two subsamples were formed, a group which showed ratios of 1 or less and a second group displaying ratios of 3 and more. As can be seen from the results in Table 13, there is remarkably little difference in the behaviour of either group, with the possible exception of the time trend variable, which appears stronger and more significant for trades with low apprenticeship/journeyman ratios. The results are open for interpretation but it is likely that past government subsidy programmes have had a stronger impact on those apprentice training programmes where fewer trainers (journeymen) were needed for expansion.

The last comparison regarding the behaviour of Canadian apprenticeship registrations centers on the Red Seal programme. While regular and Red Seal programmes are not strictly comparable on account of the different cycle indicators utilized, we nevertheless notice the negative and statistically significant coefficient for wage differentials in the case of Red Seal programme registrations (Table 13). The only explanation which can be offered and which would also be consistent with earlier observations, is that apprenticeship candidates switch from low to high quality (Red Seal) training programmes under worsening employment and wage conditions in particular occupational settings.

In previous chapters, it was hypothesized that a good portion of the observed variability in apprenticeship registrations should be associated with provincial differences, particularly as regards quality and length of apprenticeship training, differing provincial sources of skilled worker supply through immigration and/or systems of education, and differences in the provincial level of skilled worker wages and wage differentials. The same regression equations with time, policy shift parameters, skilled workers immigration levels, cycle indicators, and wage differentials were, therefore, used on a provincial basis testing the following hypotheses:

1) The impact of federal manpower policies through the amendments of AOTA in 1971-72 is expected to be felt most among those provinces who traditionally have been very successful in adjusting to new grants and/or cost sharing formulas and agreements in vocational education and who had a network of educational institutions ready for expansion. The latter would suggest a lead of Quebec, Ontario, B.C. and possibly New Brunswick with the other Western and Atlantic provinces expected to show lower and less significant coefficients for the policy shift parameter.
2) When applying the full set of variables in provincial regressions, a stronger negative relationship (or a smaller positive relationship) between levels of provincial skilled worker immigration and apprenticeship training is expected in those provinces which traditionally have had high levels of immigration (such as Quebec and Ontario). On account of the split period under consideration (73-80), the time trend is a substitute for the policy shift parameter in the full variable set, hence, observations in 1) with respect to policy impact should also hold true for the time variable. As to the

expected provincial differences with regard to the cyclical sensitivity and responsiveness of training to wage differentials, no clear-cut hypothesis can be formed since the former are primarily an empirical question. However, given the larger weighting of the Canadian cycle indicators towards changes in economic activity in Ontario and Quebec, the higher proportion of cyclical apprenticeship training programmes in Ontario, and possibly a shorter-run employment relationship and training perspective of employers in Ontario (e.g. relative to the Western provinces)[8] higher cycle coefficients should be expected for Ontario and Quebec in comparison to the other provinces. To the extent that wage differentials are very large and rising faster in a particular province, a larger coefficient can be expected. On the basis of the wage data collected, this would suggest larger parameter estimates for British Columbia and Alberta.

As can be seen from Tables 15 and 16, most of these predictions were confirmed in our estimates. Apprenticeship training in British Columbia and Alberta can be explained more consistently (higher R^2), particularly, as regards wage differentials and level of immigration. On the other hand, time as a proxy for the policy effect of 72 appears less important. Comparatively, Ontario shows a greater and statistically significant coefficient for time and a larger but not significant coefficient for cyclical variability. The latter, however, appears much stronger when, instead of dwelling starts, the composite coincident indicator is employed. This was done with further breakdowns of the provincial data into compulsory and non-compulsory trades and into construction, services and manufacturing trades (see Tables 16 and 17).

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[8] On account of the historically easier and faster access to firm-external skill supplies provided by immigration and a rapidly expanding education system.

Cost of Apprenticeship Training and Market Response

No Task Force,conference or study on apprenticeship has in the past failed to point out the negative effects of high employer costs of apprenticeship training upon apprenticeship registrations. While an accurate account of the total costs of apprenticeship is well beyond the realm of this investigation, an attempt was nevertheless made to gauge the possible effects of training cost upon apprenticeship registrations by splitting the population into subsamples of high and low cost training programmes. In order to make this exercise more manageable on account of interprovincial differences, only the two largest provincial training systems, Alberta and Ontario, were considered. Trades were subsequently split on the basis of apprenticeship wages paid during the entire length of the training programme; that is, the assumption made was that the greater the difference between apprentices' wages and those of a fully skilled journeyman, the lower should be the cost of training to the firm. Since the percentage of journeyman wages paid to an apprentice vary over the period of training, a simple arithmetic average was calculated in order to obtain the average pay for apprentices in the particular trades under question for the period 1973-1980. This provided us with a distribution of low and high cost trades in terms of apprentices' wages; since Ontario's apprenticeship training programmes on average last a year longer than Alberta's, this province showed many more low cost apprenticeship training programmes, both in absolute and relative terms. We, therefore, arranged a further sample split into high and low cost training within these two provinces. All four subsamples were run using the same regression analysis employed previously. The results are reported in Table 14.

When interpreting the split sample across both provinces, we find similar patterns in the response of apprenticeship training to wage differentials but a very different pattern of adjustment towards immigration, cyclical, and secular time trends. As can be seen from the size and signs of the cycle indicator coefficients, high cost training programmes appear much more stable to the point of being countercyclical compared to low cost programmes. The coefficients are, however, not statistically significant. In terms of immigration, the results suggest it to have a higher impact on the development of low cost apprenticeship relative to high cost apprenticeship programmes. This is consistent with observations from the Department of Employment and Immigration, suggesting that there has been a secular decline in the immigration of higher cost/higher level tradesmen.[9] Although not significant, high cost programmes show a negative sign for time trend compared to a large and significant time coefficient for low cost programmes. Everything else held constant, this seems to indicate that low cost programmes grew faster than the more costly programmes. The results are similar for low/high cost comparisons within the provinces, although we also note the extremely high coefficient for wage differentials in high-cost trades in Ontario. Taken at its face value, this would suggest that apprenticeship training in high quality/high cost trades in Ontario could be expanded if employers were willing to increase wages for highly skilled journeymen. In summary, high costs of apprenticeship training appears to be an impediment to training, particularly as immigration in those trades tapered out over time, which hpwever may to some degree be overcome by wage premiums paid for higher quality skills/work.[10]

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[9] See: Department of Employment and Immigration, Labour Market Development in the 1980's, Task Force Report, Ibid., pp. 160-162.

[10] While these conclusions should be termed tentative on the basis of the rather limited data base and weak statistical evidence from the regressions, they are nevertheless in line with findings from other studies: See e.g., Noah M. Meltz, An Economic Analysis of Labour Shortages: The Case of Tool and Die Makers in Ontario, Ontario Economic Council, forthcoming.

Quality of Apprenticeship Training and Market Response

Since levels of quality in training and their dispersion across provinces and trades appear to produce different market adjustments, a more direct attempt was made to test for quality differences. In so doing, we analyzed the behaviour of registrations in individual trades in two subsamples of trades training, one which showed high levels of quality and relative consistency of this quality across provinces, and a second group composed of trades with lower levels of training and a stronger dispersion of training quality across provinces. The choice of these apprenticeship training programmes was to some extent judgmental in that the grouping was not only derived from quality indicators contained in the Ellis Chart, but also based on results from interviews with provincial officials. As high quality training programmes with little dispersion, we identified plumbers, electronic and related equipment installers, and tool and die makers. The lower quality group contained carpenters, painters and paper hangers, and plasterers. Instead of using level variables, we formed regressions which showed the percentage growth in registrations, wage differentials and immigration. As can be seen from the results displayed in Table 18 despite statistical weaknesses, different patterns appear to exist between the two groups, particularly, as regards the consistency of registration behaviour. Higher quality training programmes appears more predictable in terms of our market indicators chosen which suggests greater long-term stability of these programmes.

C) Apprenticeship Training and Mobility of Apprenticeship and Skilled Workers

The emergence of new regional and occupational labour market imbalances for skilled workers[11] has, over the last couple of years, led to a renewed debate over the adequacy of labour mobility among skilled workers, and the factors which might impede it.[12] In the course of the Constitutional debate, labour mobility issues have, in addition, been treated overwhelmingly, both by the lay press and analysts,[13] as political problems of federal and provincial efforts towards country versus province building. The problems will likely be further accentuated during the late eighties if the long-awaited energy-related construction and investment boom takes place in the Western and Atlantic provinces, thereby, calling forth maximum mobility levels among journeymen traditionally employed on such megaproject sites.

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[11] For some evidence, see:

Economic Council of Canada, In Short Supply: Jobs and Skills in the 1980's (Ottawa: Minister of Supply and Services, Canada, 1982).

[12] Canada Employment and Immigration Commission, Barriers to Labour Mobility, Unpublished, Ottawa, 1979.

[13] M.J. Trebilcook, et al., Restrictions on the Interprovincial Mobility of Resources: Goods, Capital and Labour, Interprovincial Relations (Toronto: Ontario Economic Council, 1977).

"Mobility is fine, say premiers: So is selective hiring," The Globe & Mail, September 1980.

This in turn raises questions as to the potential and actual impediments to mobility created by the existence of twelve diverse provincial and territorial systems of apprenticeship training. Specifically, the question arises as to how variations in training standards and in accreditation and licensing procedures affect both the propensity of skilled workers and apprentices to migrate and the capability of utilizing their qualifications acquired outside the province of destination.

The question as to mobility barriers created through training has further serious implications for the regional financing of vocational training by the Federal Government. While it would be both politically defensible and economically rational for the federal government to subsidize manpower training and education beyond regional or provincial needs, the same would not apply for purely provincially oriented programmes of skill development and training.

A complete and thorough answer to the aforementioned questions would have to be based on a cross-section or time-series analysis of employment and training records of skilled migrants at fairly high levels of occupational disaggregation--data which, at the present time, do not exist. Hence, we are again forced to use secondary data and indirect evidence in order to evaluate the relative restrictiveness of provincial systems of apprenticeship training upon worker mobility. A fairly good indication as to whether training has become more standardized across provinces and/or particular groups of trades can be gathered from statistics on the development of the SEALS programme gathered by the Interprovincial Standards Committee under the chairmanship of the Training Branch in the Federal Department of Employment and Immigration.

Table 19 shows the percentage of journeyman certificates issued with the Red Seal only in those trades and for those construction trades which provided for interprovincial standards examinations for all provinces from 1977 to 1980. Table 20 shows the total number of certificates with and without the Interprovincial Seal in all trades as well as the percentage of provincial certificates out of the total number of journeymen certificates issued for all provinces for the period 1971 to 1980. Yukon and the Northwest Territories were left out on account of small numbers.

While data on the effectiveness of the Red Seal Programme appear to show extreme variability across trades, provinces, as well as time, they also display expected regularities which are worth while reporting. First of all, we can observe a cyclical behaviour in the proportion of Red Seal Certification which rises during periods of decline in business activity and falls during the improvement of the business cycle. This is evident from comparisons of the cycle reference years 1974-75 and 1979-80 versus the period from 1971 to 1973 and 1975 to 1977. This is consistent with earlier observations on the cyclical behaviour of apprenticeship completions. When demand pressures are strong, provincial apprenticeship boards are more likely to grant certification under the Grandfather Clause and, similarly, apprentices foresee less need to secure higher grades or undergo the more rigorous examinations which are in existence under the Interprovincial Standards Programme.

We also note that trades which require the greatest degree of standardization in training on account of traditionally high levels of geographical mobility e.g., the construction trades, show larger percentages of apprenticeship completions with an interprovincial seal in comparison to all other trades. This observation holds true for all provinces for all years reported except for Newfoundland in 1979 and 1980. At the same time, the data show large interprovincial differences both with respect to levels and trends. The Western provinces--B.C., Alberta, Saskatchewan--as well as Nova Scotia, demonstrate discernible strong trends towards increased certification with Red Seal. Newfoundland shows a slight decline over the same period, while the remaining provinces display a mixed and temporarily varying record with some provinces, notably, New Brunswick and Ontario, displaying relatively low rates of penetration of the Red Seal programme in construction. The latter observation may be of some concern, since Ontario in recent years has become a province of outmigration and New Brunswick has traditionally been an exporter of skilled construction workers.

Quebec does not appear in either Table 19 or 20, partly because data are only available for a couple of years. More importantly, however, the number of certificates issued with interprovincial seals is so small that it is safe to maintain that the Red Seal programme has had little or no success in the province of Quebec. When combined with Regulation 5 of Quebec's construction industry labour relations act, and the fact that all certification in Quebec is compulsory, this imposes very heavy barriers of mobility in construction between Quebec and the rest of the country. It should be pointed out, however, that it is not licensing per which restricts mobility, but rather the insistence of provinces on maintaining their own standards, methods and lengths of training programmes. Indeed, some of the provinces which happen to have a larger percentage of construction trades under compulsory certification also show a larger penetration of the Red Seal programme. Since journeymen with provincial certificates can also apply for, and write, the interprovincial exam, the more serious mobility barriers are those stemming from differences in training standards.

The situation is particularly acute for apprentices who want to change the province of employment during training and who are in trades with vastly different training arrangements across the provinces. Since many apprenticeship training boards provide for exceptions, give special permissions, and dispose of other judgmental leverages in the certification process, mobility barriers cannot be entirely identified through an analysis of the Ellis Chart. Certification data presented earlier, as well as information provided to the author in interviews with provincial officials of apprenticeship, suggests that quality differences among skilled tradesmen are appreciable and this impedes mobility particularly when demand is low and when provincial authorities are less lenient in granting exceptions.

Given the slow progress which so far has been made through either the Canadian Conference of Commissioners on Uniformity of Registration[14] or the Interprovincial Standards Committee in providing uniformity in apprenticeship training, a number of alternative approaches in terms of financial incentive schemes and concensus mechanisms may be required. They will be discussed in greater detail in Chapter V.

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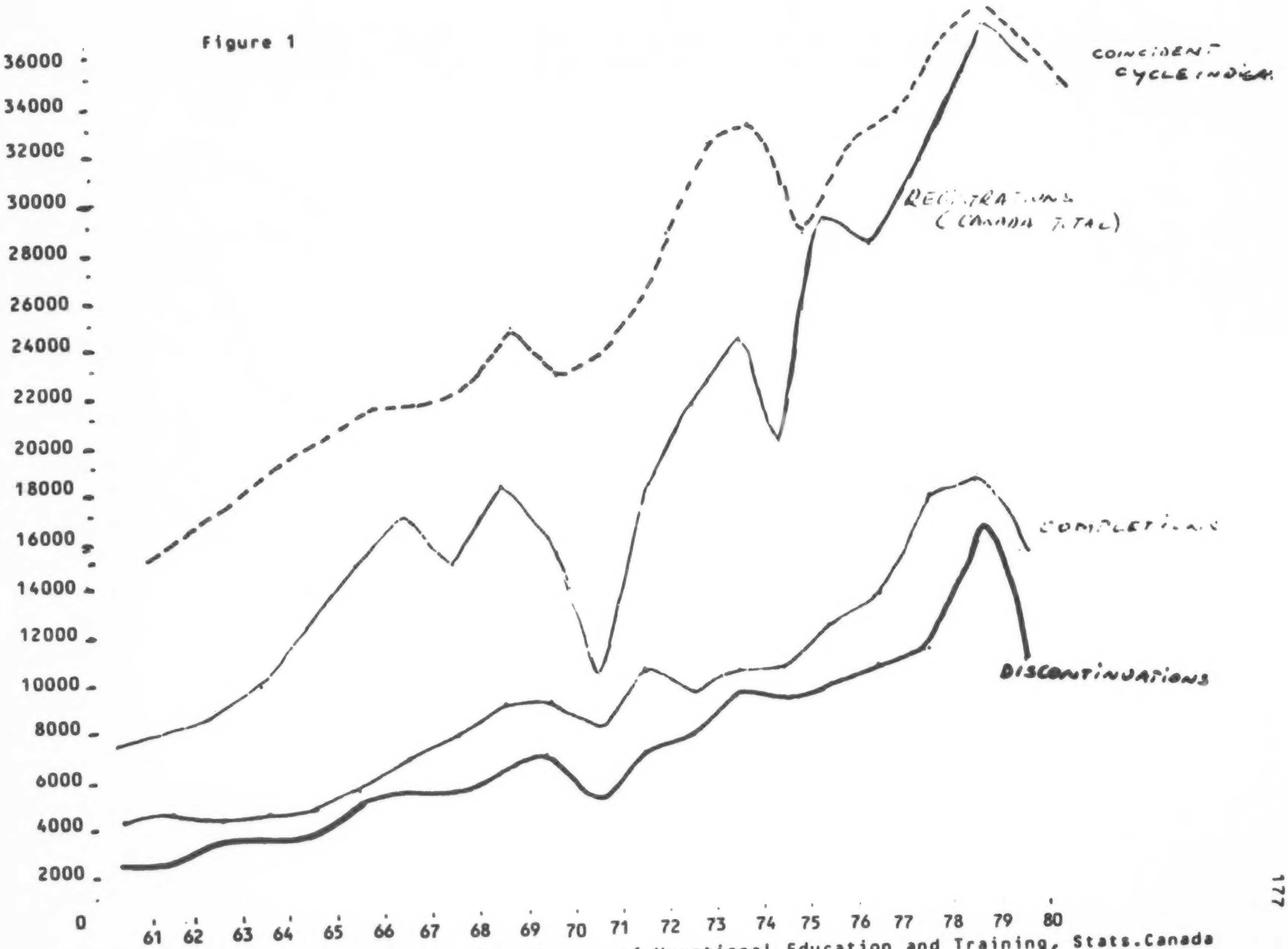
[14] See also: Trebilcock, M., G. Kaiser and R. Prichard, Restrictions on the Interprovincial Mobility of Resources: Goods, Capital and Labour in Intergovernmental Relations (Toronto: Ontario Economic Council, 1977), p. 119.

The overall findings of our empirical investigation can, therefore, be summarized as follows:

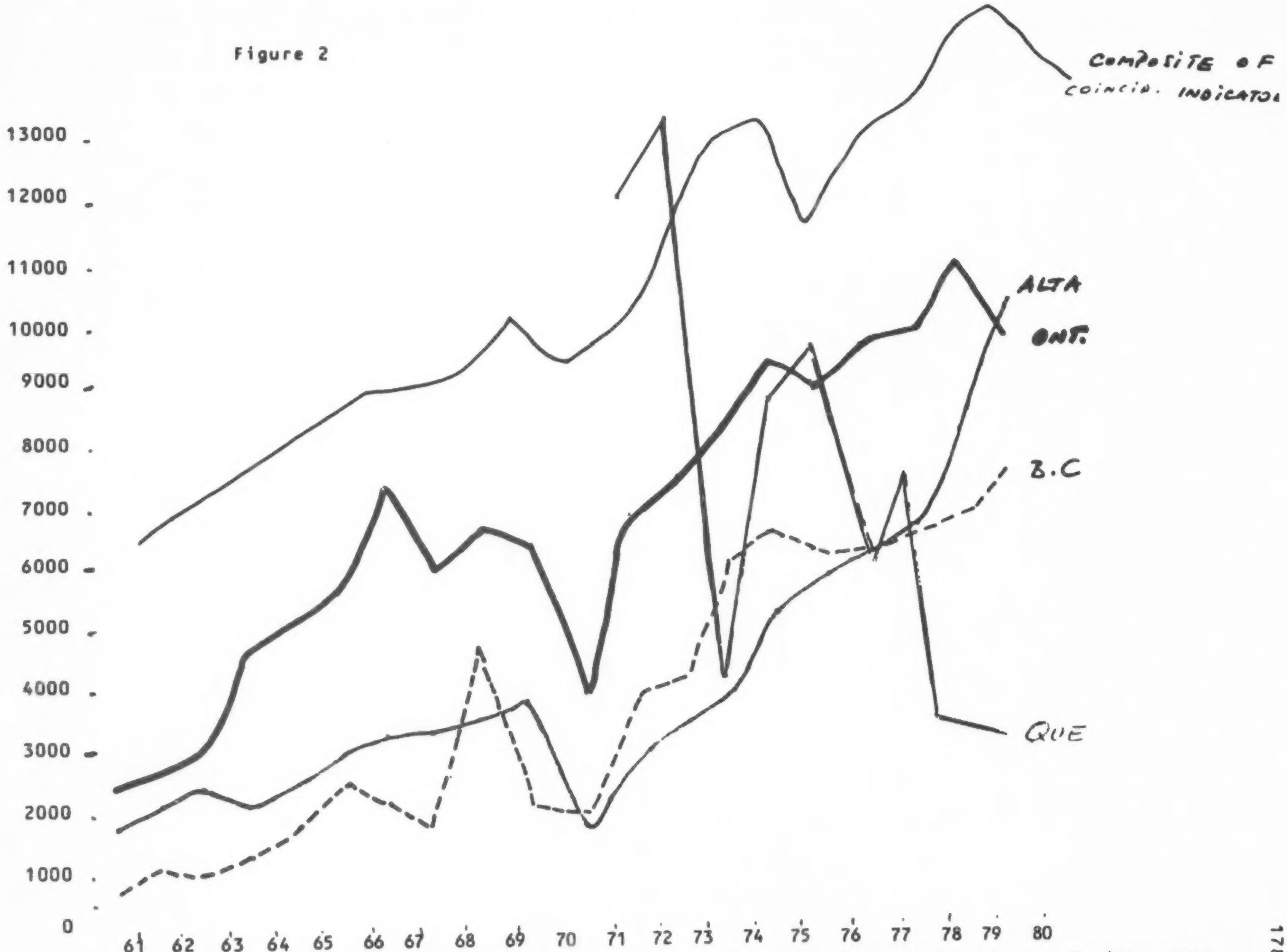
1) On average, apprenticeship training has responded moderately to government support programmes in terms of quantity. There has been, however, a proliferation of low quality skill formation and a tendency for quality dispersion which was further reinforced by disparate provincial developments.
2) As found in prior studies, Western provinces provide more training in terms of both quantity and quality relative to the Eastern provinces and Central Canada, due in large measure to a more balanced approach towards education and less reliance on immigration and interprovincial migration.
3) Apprenticeship training appears to be very responsive to wage and employment conditions, particularly wage differentials between unskilled and journeymen wages in apprenticeable occupations.
4) There are no firm conclusions about the interrelationship between immigration and apprenticeship training.
5) A central problem of apprenticeship training seems to be the low quality of training in particular trades and provinces.

Figure 1



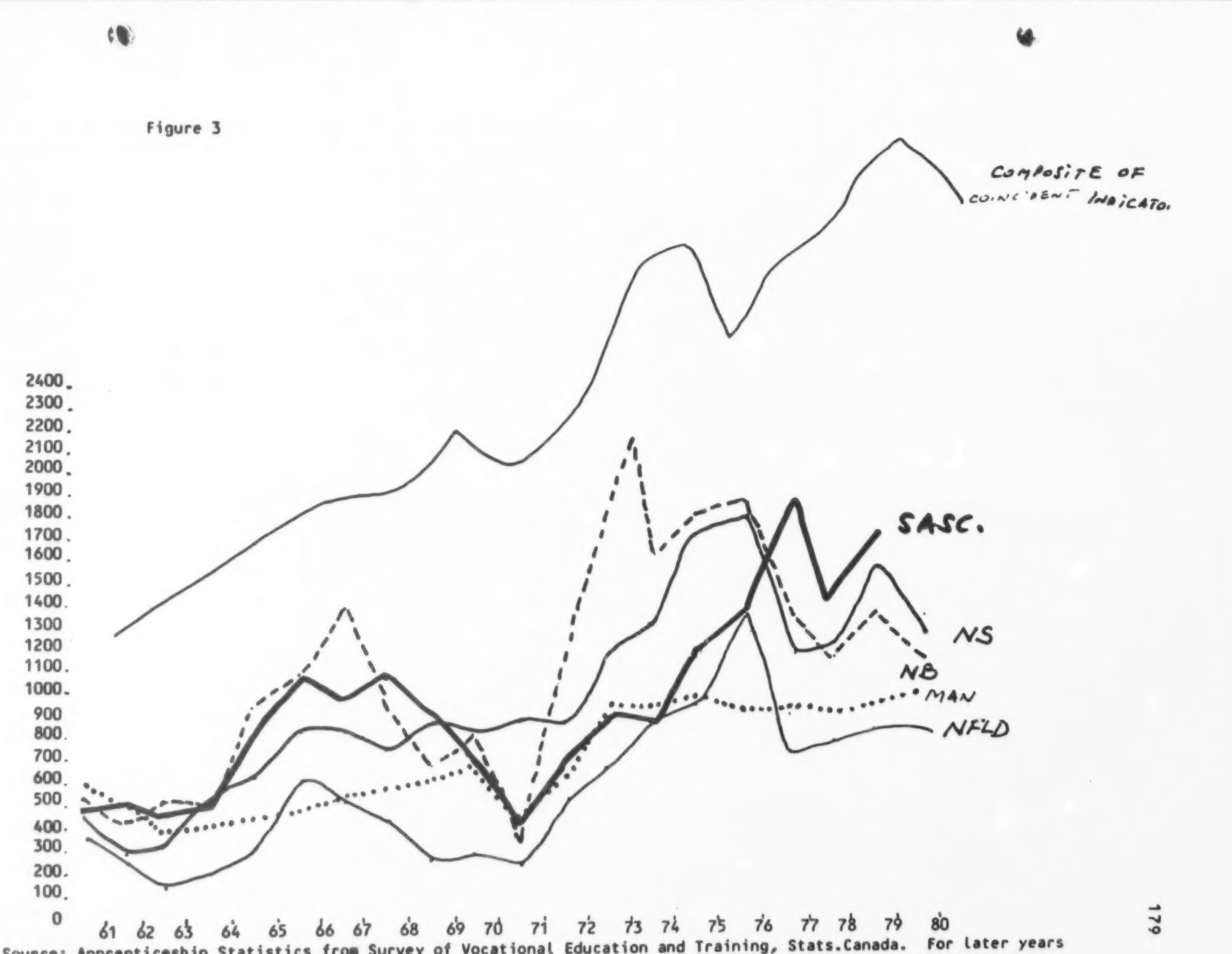
Source: Apprenticeship Statistics from Survey of Vocational Education and Training, Stats.Canada
For later years, from Training Branch, Employment & Immigration, Ottawa.
Composite of Coincident Indicators, Stats. Canada, published by Singer Associates.

Figure 2



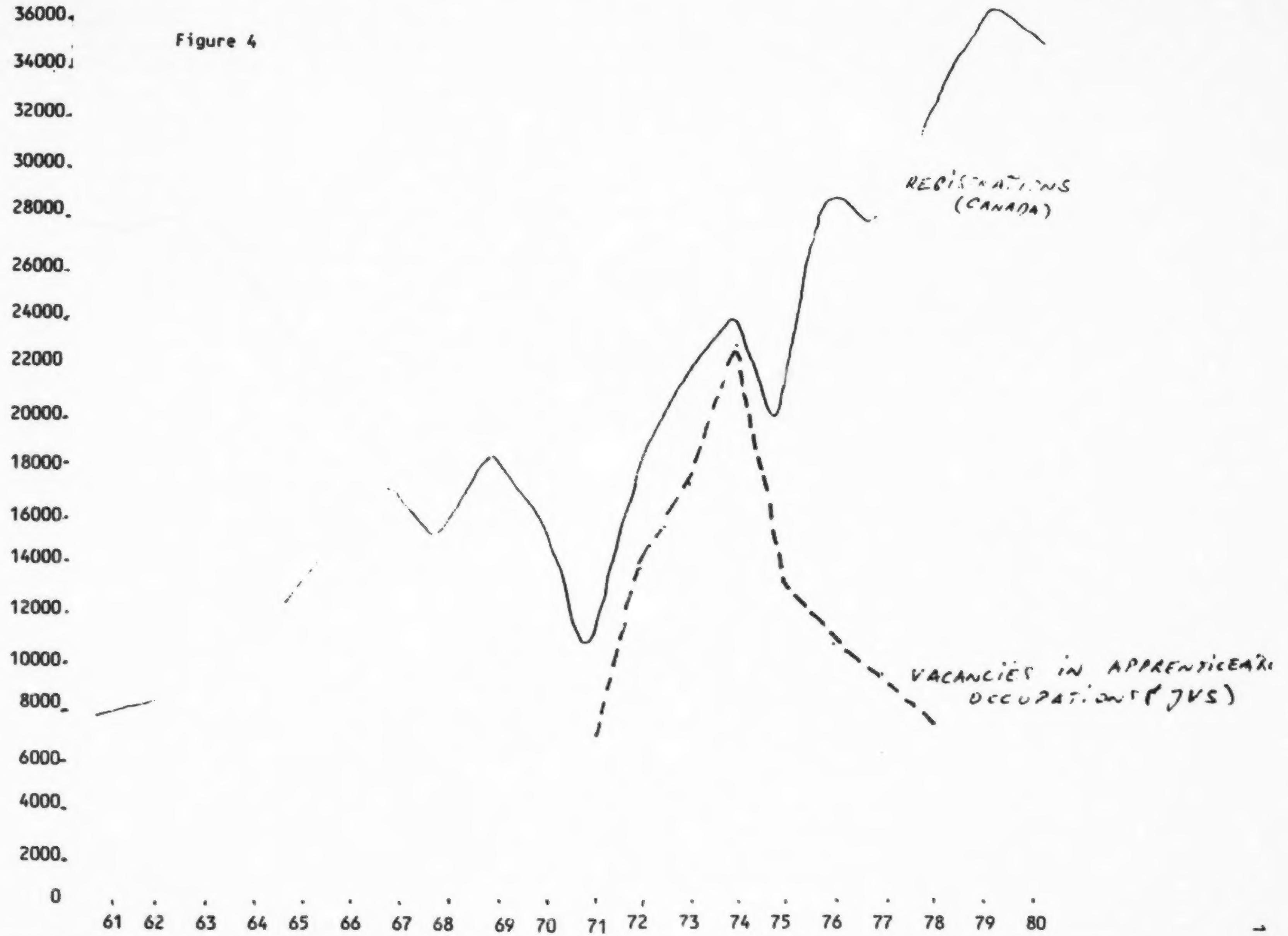
Source: Apprenticeship Statistics from Survey of Vocational Education and Training, Stats. Canada. For later years from Training Branch, Employment and Immigration, Ottawa. Composite of coincident Indicators, Stats. Canada, published by Singer Associates.

Figure 3



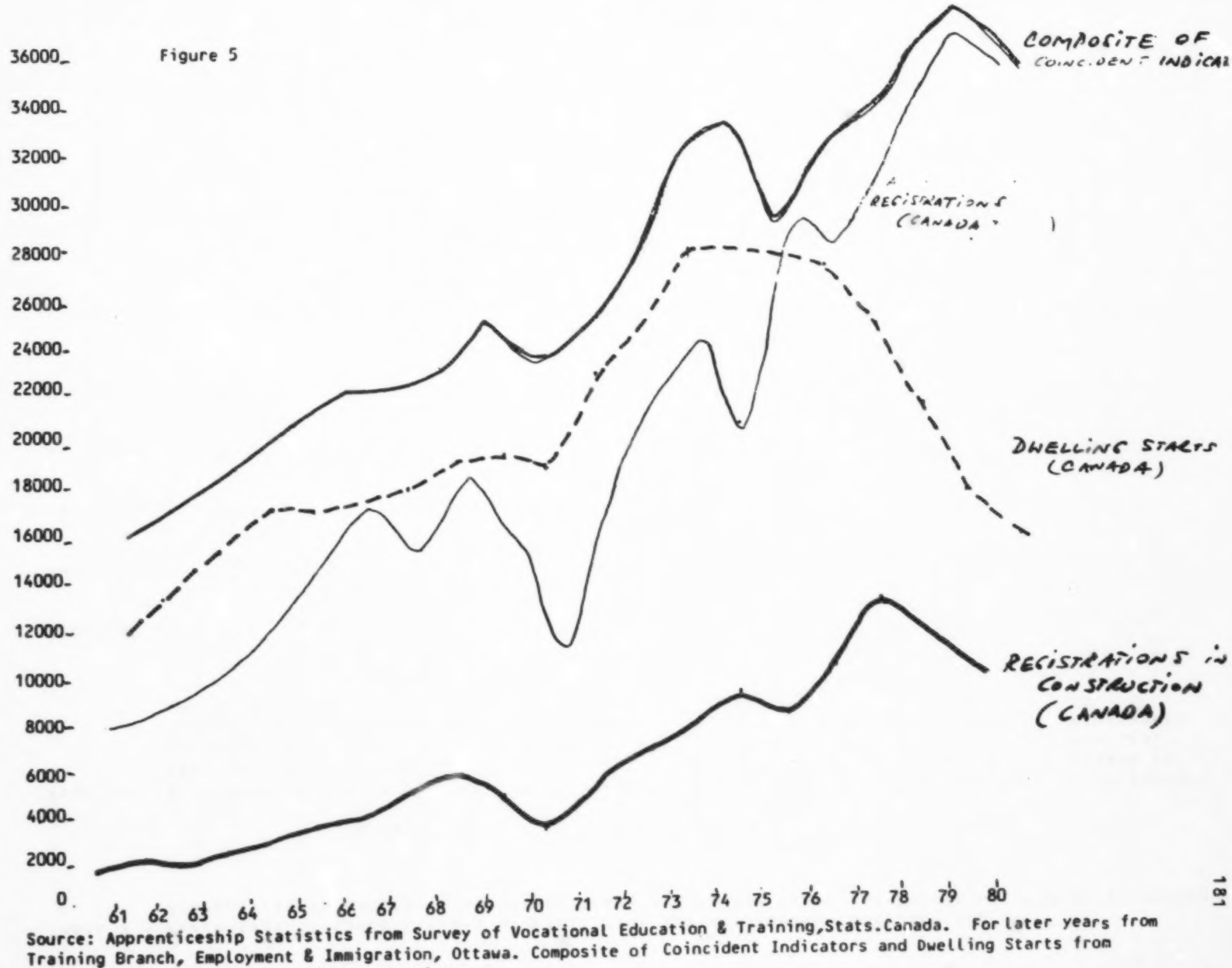
Source: Apprenticeship Statistics from Survey of Vocational Education and Training, Stats.Canada. For later years from Training Branch, Employment and Immigration, Ottawa. Composite of Coincident Indicators, Stats. Canada, published by Singer Associates.

Figure 4



Source:Apprenticeship Statistics from Survey of Vocational Education and Training,Stats.Canada.For later years from Training Branch, Employment & Immigration, Ottawa. Vacancy statistics, Job Vacancy Survey, Stats. Canada

Figure 5



Source: Apprenticeship Statistics from Survey of Vocational Education & Training, Stats. Canada. For later years from Training Branch, Employment & Immigration, Ottawa. Composite of Coincident Indicators and Dwelling Starts from Stats. Canada, published by Singer Associates.

Table 9 - Percentage of Cancellations of First Year Apprenticeship Contracts and of Apprenticeship Contracts in Select Trade Groups for Provinces Reporting 1978/79 & 1979/80

Province	78/79			79/80		
	% of First Year Contract Cancellations (out of total cancellations)	% of Cancellations in Seal Programmes	% of Cancellations in Non-Seal Programmes	% of First Year Contract Cancellations (out of total cancellations	% of Cancellations in Seal Programmes	% of Cancellations in Non-Seal Programmes
Alberta	61.2	11.7	13.3	59.2	8.9	9.6
Manitoba	11.4	12.4	23.8	9.3	10.9	10.4
Saskatch.	53.4	8.6	13.1	56.0	9.7	11.9
N. Scotia	32.5	12.4	11.6	n/a	10.2	4.8
P.E.I.	28.1	17.4	55.6	29.0	11.9	23.5

Source: Interprovincial Standards Committee, Employment and Immigration, Ottawa 1979 and 1980

Table 10 - Correlation coefficients between Apprenticeship Registrations and Apprenticeship Completions for specific programmes lagged for the appropriate length of training - Select Trades, Canada Total 1961-1979 and attrition rates for the same Trades in 1979

Four Year Programmes	Correlation Coefficient	Cancellations as % of Total Registrations
Industrial Instrument Mechanic	.834*	7.8%
Moulder Core Maker	.718*	15.6%
Tool & Die Maker	-.243	20.1%
Electrical Equipment Assembler	.820*	15.0%
Sheet Metal Worker	.955*	-
Electrical and Related Equipment Installer	.964*	15.0%
Pipe Fitter	.955*	14.1%
Construction Electrician	.001	11.3%
Carpenter	.181	19.2%
Industrial Mechanic	.108	16.7%
Motor Vehicle Mechanic	-.2311	35.6%
Three Year Programmes		
Excavators,Graders & Related	.390	15.6%
Painter & paper-hanger	.0315	24.9%
Boiler Maker	.707*	7.9%
Ironworker	.381	21.5%
Roofer	.737*	27.8%
Chefs and Cooks	.128	27.4%
Motor Vehicle Body Man	.083	25.6%
Bakers	.595	28.0%

* statistically significant at 1%

Source: Own calculations

Table 11 - Regression Results: Impact of Changes in AOTA instituted in 71/72 and introduced as shift parameters in 1972

Canada Total

	Regression Coefficient	T-value	Prob.>|T|
Intercept	826.66	13.13	.0001
Policy change	746.26	6.66	.0001
Time	90.47	8.95	.0001

F - Ratio = 424.84 N= 5016
Prob.> F = .0001
R^2 = .145

Construction Trades

	Regression Coefficient	T-value	Prob.>|T|
Intercept	363.30	7.59	.0001
Policy change	487.56	5.72	.0001
Time	43.88	5.71	.0001

F - Ratio = 227.67 N= 1976
Prob.> F = .0001
R^2 = .188

Service Trades

	Regression Coefficient	T-value	Prob.>|T|
Intercept	367.95	7.39	.0001
Policy	242.41	2.74	.0063
Time	18.59	2.33	.0200

F - Ratio = 44.68 N=1368
Prob.> F = .0001
R^2 = .061

Manufacturing Trades

	Regression Coefficient	T-value	Prob.>|T|
Intercept	95.41	4.59	.0001
Policy	16.28	.44	.6595
Time	28.01	8.41	.0001

F - Ratio = 144.87
Prob.> F = .0001
R^2 = .148
N = 1672

N= Number of Observations

Table 12 - Regression Results: Total Canadian Registrations in all trades and in construction, services and manufacturing against level of immigration in apprenticeable occupations, wage differentials between skilled and unskilled work in apprenticeable occupations, lagged dwelling starts (LDWE), leading cycle indicator and time

Total Registrations

	Regression Coefficient	T-value	Prob.>|T|
Intercept	-76.300	-.853	.394
Time	10.859	2.481	.013
TDIF	25.942	5.830	.0001
LDWE	.156	.454	.6500
TIMM	.897	19.562	.0001

F - Ratio = 107.99 N= 2112
Prob.> F = .0001
R^2 = .257

Construction Trades

	Regression Coefficient	T-value	Prob.>|T|
Intercept	821.468	1.404	.1608
Time	-25.548	-.792	.4287
TDIF	322.809	7.469	.0001
LDWE	-1.436	-.644	.5199
TIMM	2.586	6.257	.0001

F - Ratio = 35.02 N= 832
Prob.> F = .0001
R^2 = .214

Service Trades

	Regression Coefficient	T-value	Prob.>|T|
Intercept	351.249	.368	.714
Time	91.781	2.547	.0114
TDIF	53.219	1.717	.0871
LREF	-.207	-.027	.978
TIMM	3.331	13.414	.0001

F - Ratio = 48.50 N= 576
Prob.> F = .0001
R^2 = .414

Table 12 (continued)

Manufacturing Trades

	Regression Coefficient	T-value	Prob.>|T|
Intercept	808.618	2.034	.043
Time	71.853	4.656	.0001
TDIF	15.299	.857	.3917
LREF	-4.043	-1.274	.2033
TIMM	1.062	6.862	.0001

F - Ratio = 18.01
Prob.>F = .0001
R^2 = .1375
N = 704

TDIF = Wage differential between skilled and unskilled work in apprenticeable occupations

LREF = Cycle of leading indicators lagged one period

LDWE = Dwelling starts lagged one period

TIMM = Level of skilled worker immigrants in apprenticeable occupations

N = Number of Observations.

Table 13 - Split sample Regressions compulsory/non-compulsory, low and high apprentice/journeyman ratios and Red Seal registrations

Compulsory

	Regression Coefficient	T-value	Prob. >|T|
Intercept	15752.000	30.679	0.0001
Time	397.239	19.919	0.0001
TDIF	313.062	17.603	0.0001
REF	-120.254	-29.266	0.0001
TIMM	7.722	42.485	0.0001

F - Ratio = 764.97 N = 327
Prob. >F = 0.0001
R2 = 0.2536

Non-Compulsory

	Regression Coefficient	T-value	Prob. >|T|
Intercept	13492.19	43.251	0.0001
Time	328.080	27.061	0.0001
TDIF	114.050	10.501	0.0001
REF	-96.132	-38.500	0.0001
TIMM	3.249	28.948	0.0001

F - Ratio = 618.22 N = 1785
Prob. >F = 0.0001
R2 = 0.1827

Low Apprentice/Journeyman Ratios (1 or less)

	Regression Coefficient	T-value	Prob. >|T|
Intercept	26.698	.149	.881
Time	15.658	2.261	.024
TDIF	23.210	3.738	.0002
REF	-.497	-.348	.728
TIMM	.934	16.429	.0001

F - Ratio = 74.1
Prob. >F = .0001
R2 = .257
N = 863

Table 13 (continued)

High Apprentice/Journeyman Ratios (3 or higher)

	Regression Coefficient	T-value	Prob.>|T|
Intercept	-25.409	.2399	.811
Time	-.517	.125	.901
TDIF	35.499	9.436	.0001
REF	-.124	-.147	.884
TIMM	.524	8.22	.0001

F - Ratio = 40.5 N= 448
Prob.>F = .0001
R^2 = .294

Red Seal Registrations Only

	Regression Coefficient	T-value	Prob.>|T|
Intercept	48.759	.197	.844
Time	27.124	2.839	.0047
TDIF	-24.087	-2.471	.014
REF	-.254	-.129	.898
TIMM	1.201	17.008	.0001

F - Ratio = 73.59
Prob.>F = .0001
R^2 = .367
N = 1848

N = Number of Observations

Table 14 - Regression Results from Subsamples of High and Low Cost Trades Training in Ontario and Alberta

	Regression Coefficient	T-ratio	Prob.>|T|
HIGH COST			
Ontario			
Intercept	-1499.53	-1.518	0.138
Time	-130.443	-2.486	0.018
TDIF	642.667	6.869	0.0001
REF	-7.818	-0.994	0.327
TIMM	0.493	1.365	0.181
F - ratio = 11.90	N = 42		
Prob.>F = 0.0001			
R^2 = 0.5834			
Alberta			
Intercept	-1248.22	-2.238	0.030
Time	-14.718	-0.677	0.502
TDIF	101.642	3.676	0.0006
REF	-6.604	-1.573	0.123
TIMM	3.231	4.805	0.0001
F - ratio = 7.47	N = 49		
Prob.>F = 0.0001			
R^2 = 0.4046			
Both Provinces			
Intercept	-120.121	-0.187	0.852
Time	-7.694	-0.268	0.789
TDIF	137.324	4.437	0.0001
REF	-1.825	-0.355	0.724
TIMM	0.591	2.306	0.034
F - ratio = 7.74	N= 91		
Prob.>F = 0.0001			
R^2 = 0.2717			
LOW COST			
Ontario			
Intercept	-1328.07	-0.619	0.540
Time	253.647	2.999	0.005
TDIF	232.819	2.837	0.008
REF	-1.043	-0.061	0.952
TIMM	2.194	6.627	0.0001
F - ratio = 12.39			
Prob.>F = 0.0001			
R^2 = 0.5931			
N = 42			

Table 14 (continued)

	Regression Coefficient	T-ratio	Prob.>|T|
LOW COST			
Alberta			
Intercept	-1438.02	-2.381	0.023
Time	8.717	0.392	0.697
TDIF	127.594	8.506	0.0001
REF	8.806	1.857	0.071
TIMM	3.892	8.243	0.0001

F - ratio = 28.02 N = 42
Prob.>F = 0.0001
R^2 = 0.7518

	Regression Coefficient	T-ratio	Prob.>|T|
Both Provinces			
Intercept	-756.383	-0.630	0.531
Time	111.052	2.428	0.018
TDIF	136.210	4.125	0.0001
REF	1.621	0.169	0.866
TIMM	1.700	8.146	0.0001

F - ratio = 18.70
Prob.>F = 0.0001
R^2 = 0.4961
N = 84

N = Number of Observations

Table 15 - Regression Results for Provincial Apprenticeship Registrations versus level of annual immigration of skilled workers in occupation j (TIMM), provincial wage differentials (TDIF), dwelling starts lagged one period (LDWE) and time (TIME)

	Regression Coefficient	T-ratio	Prob.>|T|
ALBERTA			
Intercept	-78.245	-0.343	0.732
Time	9.541	0.833	0.406
TDIF	66.851	5.656	0.0001
LDWE	-0.549	-0.626	0.532
TIMM	3.019	9.748	0.0001
F Ratio = 29.00	N = 173		
Prob.>F = 0.0001			
R^2 = 0.4099			
BRITISH COLUMBIA			
Intercept	-297.251	-1.969	0.051
Time	10.752	1.473	0.142
TDIF	49.483	5.752	0.0001
LDWE	0.627	1.121	0.264
TIMM	1.714	11.071	0.0001
F Ratio = 35.61	N = 192		
Prob.>F = 0.0001			
R^2 = 0.432			
MANITOBA			
Intercept	-29.226	-0.580	0.563
Time	0.966	0.364	0.716
TDIF	14.653	4.549	0.0001
LDWE	0.029	0.150	0.881
TIMM	1.243	7.619	0.0001
F Ratio = 17.41	N = 144		
Prob.>F = 0.0001			
R^2 = 0.3338			
NEW BRUNSWICK			
Intercept	-63.819	-0.601	0.549
Time	-5.200	-1.023	0.308
TDIF	12.743	2.151	0.033
LDWE	0.409	0.982	0.328
TIMM	2.500	2.624	0.010
F Ratio = 2.99			
Prob.>F = 0.0213			
R^2 = 0.0867			
N = 151			

Table 15 (continued)

NEWFOUNDLAND

	Regression Coefficient	T-ratio	Prob.>|T|
Intercept	-39.320	-0.562	0.576
Time	-1.897	-0.533	0.595
TDIF	11.907	3.210	0.002
LDWE	0.184	0.703	0.483
TIMM	4.315	3.457	0.001

F Ratio = 5.58 N = 121
Prob.>F = 0.0004
R2 = 0.1613

NOVA SCOTIA

	Regression Coefficient	T-ratio	Prob.>|T|
Intercept	2.089	0.024	0.981
Time	1.369	0.331	0.741
TDIF	15.004	3.213	0.002
LDWE	-0.063	-0.189	0.850
TIMM	7.028	6.742	0.0001

F Ratio = 12.52 N = 161
Prob.>F = 0.0001
R2 = 0.243

ONTARIO

	Regression Coefficient	T-ratio	Prob.>|T|
Intercept	-726.961	-1.468	0.144
Time	79.392	3.248	0.001
TDIF	39.834	1.950	0.053
LDWE	1.620	0.879	0.381
TIMM	0.988	7.592	0.0001

F Ratio = 15.01 N = 191
Prob.>F = 0.0001
R2 = 0.244

SASKATCHEWAN

	Regression Coefficient	T-ratio	Prob.>|T|
Intercept	-74.376	-0.843	0.401
Time	-2.358	-0.553	0.581
TDIF	21.940	4.888	0.0001
LDWE	0.129	0.382	0.703
TIMM	5.333	7.402	0.0001

F Ratio = 16.11 N = 144
Prob.>F = 0.0001
R2 = 0.317

QUEBEC

	Regression Coefficient	T-ratio	Prob.>|T|
Intercept	1453.592	2.25	0.027
Time	-17.872	-0.45	0.657
TDIF	-4.456	-0.05	0.956
DWE	-4.209	-1.66	0.099
TIMM	0.201	0.42	0.679

F Ratio = 0.82
Prob.>F = 0.5187
R2 = 0.03318
N = 100

N = Number of Observations

Table 16 - Regression Results for Construction, Service and Manufacturing Trades - Ontario and Alberta

	Regression Coefficient	T-ratio	Prob.>|T|
ALBERTA - Construction			
Intercept	2421.599	12.776	0.0001
TIMM	-0.073	-0.174	0.863
TDIF	-13.671	-0.701	0.485
Time	476.150	36.379	0.0001
LDWE	-3.706	-4.929	0.0001
F Ratio = 1054.15	N = 96		
Prob.>F = 0.0001			
R^2 = 0.9816			
ALBERTA - Service			
Intercept	1165.035	3.352	0.002
TIMM	0.227	0.865	0.394
Time	104.112	8.421	0.0001
TDIF	-1.151	-0.118	0.907
LREF	-1.335	-0.494	0.625
F Ratio = 30.70	N = 36		
Prob.>F = 0.0001			
R^2 = 0.8037			
ALBERTA - Manufacturing			
Intercept	1593.931	5.149	0.0001
TIMM	0.423	1.419	0.162
Time	228.030	18.983	0.0001
LREF	-8.269	-3.370	0.0015
TDIF	1.636	0.120	0.905
F Ratio = 136.62	N = 55		
Prob.>F = 0.0001			
R^2 = 0.9177			
ONTARIO - Construction			
Intercept	2344.73	8.719	0.0001
TIMM	-0.107	-1.124	0.265
TDIF	17.430	0.761	0.449
Time	85.218	5.673	0.0001
LDWE	1.804	1.831	0.071
F Ratio = 18.71	N = 92		
Prob.>F = 0.0001			
R^2 = 0.4995			

Table 16 (continued)

	Regression Coefficient	T-ratio	Prob.>|T|
ONTARIO - Service			
Intercept	2818.779	7.444	0.0001
TIMM	0.049	0.852	0.400
Time	179.897	12.166	0.0001
TDIF	-2.401	-0.264	0.793
LREF	1.583	0.526	0.602

F Ratio = 73.66 N = 43
Prob.>F = 0.0001
R^2 = 0.8884

	Regression Coefficient	T-ratio	Prob.>|T|
ONTARIO - Manufacturing			
Intercept	-1877.62	-2.361	0.021
TIMM	0.115	0.773	0.443
Time	149.581	4.818	0.0001
LREF	19.622	3.083	0.003
TDIF	2.180	0.068	0.946

F Ratio = 23.43 N = 54
Prob.>F = 0.0001
R^2 = 0.594

N = Number of Observations

Table 17 - Regressions for Compulsory and Non-Compulsory Trades in Select Provinces

COMPULSORY

Alberta

	Regression Coefficient	T-ratio	Prob.>|T|
Intercept	24566.35	5.715	0.0001
Time	852.757	5.129	0.0001
TDIF	212.420	1.013	0.318
REF	-178.440	-5.760	0.0001
TIMM	5.500	1.450	0.156

F - ratio = 16.98 N = 42
Prob.>F = 0.0001
R^2 = 0.6473

Ontario

	Regression Coefficient	T-ratio	Prob.>|T|
Intercept	64770.2	8.677	0.0001
Time	1222.088	4.191	0.0002
TDIF	20.232	0.088	0.931
REF	-459.099	-7.717	0.0001
TIMM	-0.208	-0.180	0.858

F - ratio = 15.02 N = 41
Prob.> F = 0.0001
R^2 = 0.6253

British Columbia

	Regression Coefficient	T-ratio	Prob.>|T|
Intercept	6411.532	4.544	0.0001
Time	88.868	1.661	0.110
TDIF	94.086	0.798	0.433
REF	-47.829	-4.553	0.0001
TIMM	1.268	0.457	0.652

F - ratio = 5.96 N = 28
Prob.>F = 0.0019
R^2 = 0.5091

NON-COMPULSORY

Alberta

	Regression Coefficient	T-ratio	Prob.>|T|
Intercept	9000.986	11.971	0.0001
Time	464.518	16.017	0.0001
TDIF	9.323	0.338	0.736
REF	-61.959	-10.410	0.0001
TIMM	1.104	1.223	0.224

F - ratio = 72.03 N = 131
Prob.> F = 0.0001
R^2 = 0.6957

Table 17 (continued)

	Regression Coefficient	T-ratio	Prob.>|T|
NON-COMPULSORY			
Ontario			
Intercept	19994.18	11.947	0.0001
Time	677.665	10.101	0.0001
TDIF	1.214	0.023	0.982
REF	-135.158	-10.062	0.0001
TIMM	-0.089	-0.265	0.792

F - ratio = 33.45   N = 150
Prob.>F = 0.0001
R^2 = 0.4799

	Regression Coefficient	T-ratio	Prob.>|T|
British Columbia			
Intercept	35737.2	11.114	0.0001
Time	485.698	3.849	0.0002
TDIF	146.398	1.138	0.257
REF	-248.723	-9.705	0.0001
TIMM	1.093	0.459	0.647

F - ratio = 26.12   N = 164
Prob.>F = 0.0001
R^2 = 0.397

N = Number of Observations

Table 18 - Regressions of Percentage Growth in Canadian Apprenticeship Registrations in Select Apprenticeable Occupations versus Percentage Growth in Wage Differentials and Levels of Immigration

CCDO 8791 Plumbers & Related Occupations

	Regression Coefficient	T-ratio	Prob. >|T|
Intercept	-0.016	-0.276	0.784
DMEAN	0.444	3.135	0.003
IMEAN	0.011	8.112	0.0001

F - ratio = 37.03
Prob.>F = 0.0001
R^2 = 0.597

CCDO 8535 Electronic & Related Equipment Installer

Intercept	-0.112	0.657	0.528
DMEAN	0.344	1.765	0.111
IMEAN	0.109	0.188	0.855

F - ratio = 2.30
Prob.>F = 0.1555
R^2 = 0.3387

CCDO 8311 Tool and Die Maker

Intercept	0.145	0.818	0.451
DMEAN	0.842	0.995	0.366
IMEAN	0.587	1.232	0.273

F - ratio = 6.10
Prob.>F = 0.0455
R^2 = 0.7094

CCDO 8781 Carpenter and related occupation

Intercept	0.100	1.818	0.075
DMEAN	-0.004	-0.025	0.980
IMEAN	0.003	1.068	0.290

F - ratio = 0.57
Prob.>F = 0.5687
R^2 = 0.0215

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Table 18 (contd)

	Regression Coefficient	T-ratio	Prob.>|T|
CCDO 8785 Painters, Paper Hangers & Related Occupations			
Intercept	0.280	0.903	0.372
DMEAN	-0.242	-0.452	0.654
IMEAN	-0.718	-1.156	0.255

F - ratio = 0.82
Prob.>F = 0.4473
R^2 = 0.0394

CCDO 8784 Plasterers and Related Occupations			
Intercept	0.022	0.135	0.894
DMEAN	0.417	1.241	0.227
IMEAN	-0.010	-0.096	0.924

F - ratio = 0.78
Prob.>F = 0.4717
R^2 = 0.0633

N = 56 for all occupational groupings

DMEAN = Percentage growth in wage differentials

IMEAN = Percentage growth in immigration of workers in related occupation

Table 19 - Percentage of Journeyman Certificates with Interprovincial Standard Seal in all Trades with Interprovincial Standards Examination and in all Construction Trades with Interprovincial Standards Examinations 1976-1980*

		NFLD	PEI	N.S.	N.B.	ONT	MAN	SASK	ALTA	B.C.
76/77	All trades with ISE	77.8	93.7	44.3	37.5	51.3	90.2	30.2	50.3	43.4
	All construction trades with ISE	80.6	97.3	54.9	39.4	58.9	93.9	28.5	48.5	49.6
77/78	All trades with ISE	74.2	96.2	55.8	48.8	55.1	92.8	34.8	51.2	42.11
	All construction trades with ISE	76.7	100%	68.6	58.8	56.2	94.7	36.9	46.0	46.2
78/79	All trades with ISE	77.4	96.8	60.4	46.3	32.5	91.4	53.5	57.9	44.8
	All construction trades with ISE	76.0	96.8	76.4	48.9	46.2	94.4	61.8	59.2	52.2
79/80	All trades with ISE	73.4	97.5	99.7	42.7	17.4	88.0	51.7	54.8	65.6
	All construction trades with ISE	73.2	96.3	100%	46.3	56.4	90.4	68.5	75.7	79.2

* As compared to table 20 which shows all seal certificates issued, this table only refers to numbers issued in trades with Interprovincial Standards Examination.

SOURCE: Interprovincial Standards Committee, Employment and Immigration, Ottawa.

Table 20 - Number of Journeymen's Certificates Granted With and Without Interprovincial Seal

	71/72			72/73			73/74			74/75			75/76		
PROV	With Seal	With out Seal	% With Out Seal	With Seal	With out Seal	% With out Seal	With Seal	With out Seal	% With out Seal	With Seal	With out Seal	% With out Seal	With Seal	With out Seal	% With out Seal
NFLD	286 (66)*	127	26.5	182 (21)	189	48.2	290 (92)	72	15.9	268	43	13.8	386	633	62.2
PEI	31 (45)	52	40.6	17 (8)	34	57.5	18	8	30.7	58	-	0	48	54	52.9
N.S.	282 (22)	652	68.2	271 (19)	2032	87.6	229 (17)	924	78.9	661	131	17.5	373	762	67.1
N.B.	137 (77)	893	80.7	89 (50)	351	71.6	121 (54)	479	73.2	482	139	22.4	224	224	50.0
ONT.	50 (666)	n.a	n.a	1124 (481)	15377	90.6	1120 (424)	10620	87.3	2981	842	22.0	1854	3131	62.8
MAN.	334 (-)	29	7.9	375 (22)	79	16.6	378 (24)	105	20.8	410	76	15.6	367	513	58.3
SASK	193 (83)	274	49.8	190 (76)	393	56.6	156 (52)	460	68.9	221	19	7.9	179	272	60.4
ALTA	1385 (241)	1354	45.5	1477 (215)	3451	67.1	1279 (245)	4451	74.5	1295	496	27.7	1298	1877	59.2
B.C.	1040	2434	70.0	957	1827	65.6	1060	1065	50.0	1026	839	44.9	1813	2148	54.3

* Number in brackets represents Red Seals issued without apprenticeship for 71-73, for later years this figure is included in the total number of Red Seals issued

n.a not available

Source: Interprovincial Standards Committee, Department of Employment and Immigration, Ottawa

Table 20 (2) - Number of Journeymen's Certificates Granted with and Without Interprovincial Seal

PROV	76/77 With Seal	76/77 With out Seal	76/77 % With out Seal	77/78 With Seal	77/78 With out Seal	77/78 % With out Seal	78/79 With Seal	78/79 With out Seal	78/79 % With out Seal	79/80 With Seal	79/80 With out Seal	79/80 % With out Seal
NFLD	580	403	41.0	726	552	43.2	684	404	39.1	536	259	32.6
PEI	89	6	6.0	75	3	3.8	90	5	5.3	77	2	2.5
N.S.	429	646	60.1	617	514	45.5	533	418	43.9	563	69	10.9
N.B.	671	1452	68.4	741	1105	59.9	649	870	57.3	632	952	60.1
ONT.	2764	6314	69.6	2976	6277	67.9	3068	6364	67.5	2945	13987	82.6
MAN.	636	150	19.1	666	185	21.8	668	158	19.2	632	349	25.2
SASK	255	661	72.2	355	718	67.0	558	514	48.0	712	671	48.5
ALTA	1953	3554	64.6	2260	5717	71.7	2783	5888	67.9	3309	6964	67.8
B.C.	2039	3218	61.3	2360	3520	59.9	1973	2623	57.1	2069	1052	33.7

Source: Interprovincial Standards Committee, Department of Employment and Immigration, Ottawa

CHAPTER V

Conclusions and Policy Recommendations

Before making specific recommendations with respect to provincial and federal policies towards apprenticeship, a brief review of major findings will be presented starting with the broader historical, socio-political and institutional framework and its changes over the post-war period, leading subsequently to specific issues and aspects of Canadian apprenticeship training.

Canada's sluggish development of apprenticeship and other forms of employer based training has been conditioned to a large extent by industrial and educational policies which have been carried out at various levels of government. In terms of overall industrial strategies, Canadian economic development was thought to be best served through a liberal policy of foreign investment and immigration coupled with tariff protection in large segments of Canada's industrial base, an old policy which was essentially continued throughout the post-war period. As to the development of education policies, in Canada, these were largely nurtured by the so-called "Human Capital Revolution" of the early sixties which was based initially on studies in the United States showing high rates of returns to formal schooling in comparison to other human and non-human investments. Given Canada's low rates of educational attainment among workers, coupled with a brain-drain phenomenon in the early sixties, this has led to a spectacular rise in secondary and, particularly, post-secondary education throughout the sixties and most of the seventies. Both policy stances have, in consequence, led to very deep-seated philosophies, perceptions and social values with respect to the development, utilization and appreciation of blue-collar industrial skills. On the employer side, management, already conditioned to slack on account of lacking international competition, very quickly adjusted to liberal immigration and education policies by relying heavily on cheap means of skill acquisition in the form of immigrants and, later, the output of the educational system. As far as blue-collar labour markets were concerned, these developments further reinforced orthodox perceptions of and attitudes towards work and workers in that the firm's interest was seen to be best served through the creation of flexible labour bourses from which "homogeneous" labour could be hired and into which it could be released on short notice. Expectedly, only very few and very spececific types of labour have been subjected to the kind of scrutiny, costing, and planning that firms typically apply to other fixed factors of production such as capital. For the most part, labour has been considered a truly variable factor of production, unworthy of longer-term consideration. An illustration of this is the still existing and empirically validated difference in intensity and approach of training towards managers versus skilled workers. If skilled journeymen are needed, firms expect them to be available on the market. If managerial talent is in demand, firms plan for it much more carefully and provide the requisite training. The lack in extent and sophistication of manpower forecasting and planning in Canadian firms can be taken as a further good indication of such short-term practices and biases. Excessive reliance on obtaining adequate manpower through mobility in firm-external labour markets was further reinforced through the expansion of formal schooling. And this development, in turn, was fed by employers' faith that more educated people were indeed also more productive, by parents' conviction that their children would indeed reap high returns on their foregone earnings and educational expenditures, and by governments' assumption of continuing positive social marginal returns to schooling. The cumulative net effect of these attitudinal changes was an almost complete institutionalization of learning at the expense of many forms of employer-sponsored types of training, particularly, initial- and apprenticeship training, and an increased use of schooling as a screening device.

With the exception of construction unions, who as a matter of ongoing concern have voiced criticism about vocational education and who have been both actively and passively involved in the development of the apprenticeship training system, Canadian unions have generally remained rather apathetic or predictably orthodox in matters of both training and work organization when compared, for example, with the union movements in other jurisdictions. The recent submission of a brief to the Interparliamentary Task Force on Employment in the '80's by the Canadian Labour Congress endorsing the British levy-grant system certainly was not based on extensive prior research, consultations and/or past policy statements on training. As such, it failed to come to grips with many of the technical and specifically Canadian problems in apprenticeship training. Yet many of the specific problems such as the lack of high quality general training, or the old age of Canadian apprentices, may at least in part, be considered the result of past union policies and practices.

In making policy recommendations, I , therefore, have to place my empirical findings in the context of these broader post-war developments.

Recommendation No. 1: Creation of a National Independent Research Institute Specialized in Occupational Research

The rationale behind this recommendation is given by the existence of extreme, and probably unfounded, differentiations in the extent and quality of apprenticeship training across provinces as well as across occupational clusters and, on the other hand, by a serious lack of knowledge regarding linkages between the education and training system and productive work.

Before engaging in major reforms with respect to the financing of training and before establishing new bureaucratic superstructures,[1] such as the proposed Council of Employment and Training Ministries, which represent a piecemeal approach based on existing inefficient institutional arrangements, certain basic information is required. It is most important, for example, to first obtain solid and objective information regarding the relationship between the structure of worker qualifications and productivity, between alternate forms of training and worker qualifications, and between worker qualifications and potential and actual career and mobility patterns of workers. These are major areas of concern where present knowledge is either non-existent or based on fragmentary or local evidence. Such an institute should be in an excellent position both politically and as an authority on occupational qualifications to subsequently become engaged in the standardization of apprenticeship training throughout this country. It may be interesting to point out that West-German industrial training reforms in the seventies ran into similar problems of jurisdictional frictions between provincial and federal governments as well as opposition from vested interest groups which were largely overcome through the creation of such an independent Institute of Occupational Training. Its location should preferably be in one of the Western provinces.

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[1] See for example, the recommendations of the Task Force Labour Market Development in the 80's (Ottawa: Employment and Immigration, 1981), and

The Interparliamentary Task Force, Work for Tomorrow: Employment in the 80's (Ottawa: House of Commons, 1981).

Recommendation No. 2: Introduction of a Package of Policy Measures Designed to Make Apprenticeship Training a True Career and Educational Alternative to Other Forms of Skill Acquisition.

This study, as many before it, and similar to the findings of the Interparliamentary Task Force on Employment in the 80's and of the Labour Market Development Task Force of the Department of Employment and Immigration, has identified the well known deficiencies and problems of Canadian apprenticeship training. In short, these were: large differences in the quality of training providing industrial skills at very low levels of proficiency in particular trades and in particular provinces, poor self-selection and referral of young workers into apprenticeship, low penetration of females, native Canadians and other minority groups, high age of apprentices and poor employment and qualification records of apprentices, strong cyclical behaviour of the training system, high instability of employment and training among apprentices. All of these problems are appreciably heightened by the gross misconceptions of many employers, school students, educationalists and government officials about the potential usefulness of apprenticeship training.

I interpret these very same facts therefore, not solely as purely technical problems in the financing of vocational education, the provision of incentives, or in the structuring of manpower needs committees, as was done to a large measure by the Task Forces of Employment and Immigration and the House of Commons. Instead, the view is taken here that apprenticeship training ought to be established in the first place as a viable educational and career alternative for individuals by integrating it better into existing provincial systems of education. This would entail the following series of measures:

a) The development of standardized curricula in apprenticeship training to be worked out by the newly-created Institute for Occupational Training in cooperation and Consultation with provincial apprenticeship boards and the Red Seal Committee, and their integration into the provincial system of education.

b) A move towards compulsory apprenticeship in all apprenticeable occupations throughout Canada. This would merely entail standard regulations regarding the training and examination of apprentices, it would not encompass compulsory certification or licensing.

c) Measures to prevent the lay-offs of apprentices during their period of training. This could either be done through legislative measures or through a penalty/reward mechanism towards employers.

4) A tightening of standards in higher education which would increase the pool of potential apprentices and bring about a distribution of qualifications in the population more in line with the distribution of innate abilities.

If quality in apprenticeship training were ascertained and raised to a socially optimal level, and if specific apprenticeship programmes would clearly spell out career alternatives for school leavers and signal clear qualifications and productivity levels to employers, much greater faith could be placed in the efficiency of the market in responding to temporary disequilibria. Thus, one of the prime barriers towards an effectively functioning apprenticeship training system identified in this study was absolute low levels of skill formation in some programmes and a proliferation of different quality standards within given trades that lead to qualitative uncertainties in the market. The difference in the observed response to market forces between well established, high-quality training programmes with little dispersion of quality, and the fragmented, non-regulated, voluntary programmes with little quality control, is noticeable. As can be seen from Table 18, the former group (e.g., occupations CCDO 8791, 8535, 8311) shows a more consistent pattern of response, particularly, as regards wage levels and wage differentials, while the second group (occupational CCDO 8781, 8785, 8784) depicts, if any, a much more erratic and random response to market forces.

Recommendation No. 3: Legislative Provisions to Link Skilled Worker Immigration to the Level of Apprenticeship Training Carried Out in the Private Sector

My investigation was unable to prove conclusively that there is a clear substitute relationship between the level of domestically trained journeymen and the level of skilled worker immigrants and that high levels of immigration would therefore act as a deterrent to apprenticeship training. Given the tentative character of these results and the fact that, theoretically, immigration can both spur and deter apprenticeship training, it is suggested that an immigration policy be devised which would reduce the substitute or reliance effect of immigration and at the same time strengthen the complimentary relationship between skilled worker immigration and apprenticeship training. Accordingly, firms or groups of employers seeking off-shore workers would be allowed to recruit and receive skilled immigrant workers provided they are, at the same time, prepared to hire a certain number of new apprentices (e.g. at a ratio of 1 to 1). Such a regime would not unduly restrict foreign supplies where shortages might exist and at the same time, it would provide for a long-term solution to skilled worker shortages.

Recommendation No. 4: Changes in the Financing of Apprenticeship Training

The financing of transferable industrial skills, through the employer and the apprentice, stand in sharp contrast to a wide range of other forms of general training provided by the public sector, a fact which has been equally recognized by the two task forces on labour market developments and employment in the '80s. Both equity and efficiency considerations, therefore, dictate the desirability of changes in the existing formula for financing vocational education and training in Canada. In recognition of the various drawbacks of employing either a pure levy/grant or a pure payroll tax credit system, we suggest a modified payroll tax credit system, which works similarly to the former, however, has the added advantage of considerably strengthening the decision-making capabilities and responsibilities of those directly involved in the training process e.g., the apprentice and the employer providing training. The system would work as follows:

a) The total amount of training costs would be split equally between the firm, the governments and the apprentice.

b) Apprentices would receive an educational allowance or grant as long as they are in the process of completing an apprenticeship training programme.

c) On the other hand, firms would pay apprentices only according to their productivity levels during the various years of apprenticeship. Requitise information regarding relationships between training and productivity in different occupations would, to recall, be provided by the newly created Institute of Occupational Research and Training spelled out in recommendation no. 1.

d) The total funds for the apprenticeship programme would come from a percentage payroll tax levied on the employer (with some firms qualifying for exemptions), from the apprentices' lower wages during training and from matching funds in the public sector (federal and provincial government). In order to further reduce the human capital risk for the apprentice in terms of the probability of lay-offs, it is conceivable to build in penalty payments for the laying-off of apprentices while in training. As distinct from the other approaches, this system can be applied in a flexible way to different training situations with varying performance/productivity characteristics. Since, ultimately, the apprentices have the choice and the dollar votes (through the educational allowance), as to where they want to receive the on-the-job and institutional portion of their apprenticeship training programmes, there would be considerable pressures both upon the employer and the educational institutions to perform, a factor which is absent in either the pure levy/grant or payroll tax credit options.

Recommendation No. 5: Exclusion of Apprentices from the Seniority Principle Exercised by Unions

This would be the contribution of the union side to stabilize employment for apprentices while in training analogous to the penalty/reward mechanism applied to employers. If apprenticeship training can be truly considered an educational programme, it should, similarly to other forms of education, be carried through without interruption. Accordingly, unions would exempt apprentices from union procedures regarding lay-offs and recalls.

The implementation of recommendations 1 though 5, in that order of priority, along with major curricular reforms and the standardization of apprenticeship training throughout Canada, should go a long way towards establishing it as a uniform, unified route of high quality training in industrial skills for young Canadians. And, if this were so, the particular financing and controlling schemes contained in later recommendations might become superfluous for reasons of both political and market pressures for success feeds on itself. The problem of past manpower training efforts is not a lack of innovation with respect to the number of different programmes. To the contrary, I contend that it was the proliferation and multitude of different tailor-made government training programmes and their heavy subsidization which have distorted manpower allocation in the private sector and which have introduced tremendous uncertainties with respect to the usefulness of training both to trainees and employers. It is unfortunate that the philosophy of continuing diversity and proliferation of training, both with regard to specific industry and regional arrangements, has been carried forward in the two Task Force reports. My findings suggest that the development of a high quality, standardized apprenticeship training programme in apprenticeable occupations be made the primary goal, with financial and incentive arrangements subservient to this goal. More subsidy and incentive schemes grafted on to inappropriate institutional arrangements in apprenticeship training, such as exist in a number of provinces, will again only lead to short-term opportunistic behaviour of those involved in training decisions with no hope for long-term improvement of the system of industrial training. In this context, I would like to remind the reader of the dismal performance of R & D subsidization in past Canadian history which was similarly based on inputs and on quantity as opposed to output/performance and quality.

Appendix I

Apprenticeship Training in the EEC Countries: A Brief Synopsis on Legislative Structures, Methods of Financing and Trends*

As can be expected among different European systems of education, a wide variety of vocational qualifications at varying levels can be obtained. Differences exist not only with respect to the school age at which career decisions have to be made but also with respect to the breath and variability of occupational (vocational) schooling within national systems. From an overall perspective it appears that in the Federal Republic of West-Germany and Denmark virtually all vocational schooling is offered in the form of traditional (dual-type) apprenticeship training, in Ireland, Luxemburg and the United Kingdom, full time vocational schooling and apprenticeship training exist side by side with recently developed amalgams between vocational schooling and apprenticeship training while in Italy, Belgium and the Netherlands, apprenticeship training still plays a subordinate role in comparison to other forms of full-time vocational schooling. With minor exceptions, the average length of apprenticeship training is three years across most occupations and jurisdictions, which are served immediately after completion of compulsory schooling; the latter compares with graduation from grade 8 in Canada. Curriculum development is now carried out in most European countries through tripartite arrangements usually in the form of a coordinated effort between management and unions under the active participation and/or supervision of governments. Some countries, notably, the Netherlands provide for instituted measures for post-apprenticeship schooling and -training to enable skilled workers to upgrade skills and re-enter the system of formal schooling.[1] None of the nine common market countries have a centralized administration of vocational schooling and training rather jurisdictional divisions of labour exist between national, regional and local levels. They furthermore differ for full-time vocational schooling and apprenticeship training. Authorities for the development of training curricula tend to be vested within a federal ministry (labour or education) which subsequently, however, delegates the execution of training and the examination of apprentices to lower regional or local levels. For illustrative purposes, we briefly outline below the administrative structures of apprenticeship training in three European countries: France, West-Germany and the United Kingdom.

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*This can be but a brief review of apprenticeship training in Europe, the interested reader should consult regular publications and country reports published by the European Centre for the Promotion of Vocational Training (CEDEFOP) on which most of this appendix is based. For a particular reference, see: CEDEFOP, Description of Training Systems in the Countries of the Common Market, A Comparative Study, Berlin, 1981, 479 p.

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[1] For a detailed account on prevalence and variability of post-apprenticeship training schemes in Europe, see: CEDEFOP, Further Training and Educational Leave, Berlin, 1981, 320 p.

Most young people in the vocational stream in West-Germany are apprentices. As such they enter a contract with an employer/trainer for occupational training in one of the 452 occupations recognized by the Vocational Training Act (BBiG 1969). The latter regulates training standards for the on-the-job training part of training throughout West-Germany while compulsory off-the-job vocational schooling falls under the jurisdiction of individual federal states. A "permanent" conference of state ministers of culture/education is in charge of curricula and teaching in vocational schools. General training plans and criteria for qualifying exams are governed by detailed trade regulations designed to produce and maintain uniformity of abilities among skilled workers. As a consequence, certificates of apprenticeship represent well defined and visible labour market "signals" within Germany's employment system. Where regional imbalances occur or where employers lack adequate training facilities, on-the-job training is carried out in firm-external training centres provided by the government. Sixteen percent of all firms attached to the West-German Chamber of Commerce make use of their right to train yielding approximately 320,000 training firms (1972), which in terms of employment represents 60-80% of the German labour force. As of 1976, the "Federal Institute for Vocational Training", a tripartite institution has become the main coordinating body with respect to legislative initiatives, interpretation of law and occupational research. In France, about 12% of youth in their respective age groups (16-20) receive alternance (apprenticeship) training lasting two to three years and, subsequently, obtain qualification certificates (certificat d'aptitude professionelle, CAP). In 1971, the French government passed a number of laws reforming curriculum, supervision and financing of apprenticeship training in order to raise its declining social status and to improve its economic incentives. Responsibility for the off-the-job schooling portion of apprenticeship training carried out in state controlled training centres (centres de formation d'apprentis) rests with the ministry of education while work inspectors enforce all other aspects of the apprenticeship contract at the work place. To guarantee flexibilities with respect to varying and changing needs of employers in different regions occupational training advisory councils have been established at local and regional levels (commissions professionelles consultatives), which prepare recommendations on desirable changes to the apprenticeship training system and which are composed of union and management.

Apprenticeship training in Great Britain is a form of initial training lasting from four to five years. Initially, under the sole control of the employer/trainer virtually all aspects of the training relationship are now regulated by the Industrial Training Act (1964). Industrial Training Boards (composed of employers, unions and representatives from

Vocational Education) were set up under the act and now regulate and control the quality of training; as distinct from most other European countries no legal provisions exist in the United Kingdom for the part-time attendance of apprentices in vocational schools complementing the on-the-job training portion. Rather, industrial training boards use provision of grants as incentives, for generally grants are only provided if certain minimum quality standards of training are adhered to thereby enforcing higher quality or "desirable" apprenticeship training curricula. After 1973, the industrial training boards have become coordinated and financed by the Manpower Services Commission which occasionally exercises discretionary intervention on the basis of its own forecasts of manpower and educational development trends. In addition, through its staff of 3,000 employees, Industrial Training Boards offer a wide variety of advice and consulting with respect to the establishment, improvement and proper execution of apprenticeship training to firms. As is evident from the foregoing description, the British system has attempted to strengthened its much less regulatory stance on apprenticeship training through the exercise of financial controls and manpower services.

As to the financing of apprenticeship training[2] uniformity exists among the ten common market countries in that apprentices do not have to pay for their training in terms of tuition fees or related expenditures. In all EEC countries, they pay, however, in part through lower wages during training and these wages are either regulated according to apprentices' productive contributions or negotiated in collective bargaining as fixed percentages of skilled workers' earnings. The off-the-job training portion usually is financed by the government, cost-sharing agreements may exist however between national, regional and local governments and educational authorities. Governments also finance vocational training of private vocational schools such as is e.g., the case in the Netherlands. In some countries, monies for vocational training are chanelled through funds previously collected from the private sector (e.g., in the United Kingdom, France and Denmark). Control over the use of funds for training may lie with the state, the social partners or a tripartite arrangements.

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[2] For a more detailed account of relative advantages of alternative financing methods, see: Appendix II.

Common trends and problems of apprenticeship training among the ten EEC countries comprise transition and transferabilities between general and vocational forms of schooling, conflicts between individual educational growth perspectives and the dictates of the labour market, the integration of youth, marginal groups and women into initial training and gainful employment and in the case of Italy questions of decentralization and regionalization of its vocational school system. Italy has only recently attempted to rebuild its entire system of vocational schooling and training and her experience should offer some interesting insights and comparisons with Canada, where extreme regionalization and decentralization have posed similar problems of acceptance among the social partners in the past. In all European countries, numerous programmes have been established to cope with further occupational training requirements posed by social, structural and technological changes, which pose problems and questions with respect to their curricular, legal and financial integration into the overall system of vocational education and training. Solutions to a large measure are the result of and conditioned by efficiencies of historically grown systems of vocational training. This may also explain why entirely different concepts such as e.g., Netherland's state-run and institutionalized system and West-Germany's employer-run system may prove in the long-run to be equally stable alternatives.

Appendix II

Financing Alternatives in Apprenticeship Training

The two most commonly found methods for financing dual-type apprenticeship training are the levy/grant system as it is e.g., used in the United Kingdom and the payroll tax credit system which is employed in France. The third alternative of strict self-financing of training through the apprentice, often acclaimed as the optimal scheme (e.g., Becker 1964), no longer plays an important role in today's industrialized economies. The latter is explained by the fact that labour markets are far from being perfectly competitive as government interventions with respect to minimum wages and subsidization of alternate forms of initial training and/or schooling now exist in most western economies, thus biasing pure market responses towards more heavily subsidized forms of training and education. Given these restrictions, the question than reduces to one of finding an optimal scheme of sharing training costs between its potential financiers e.g., trainees, government and employers. Financial control of apprenticeship training must, however, be seen as intertwined with the aspect of quality control for financial costs of training can be altered through variations in the quality and length of apprenticeship training. The latter usually complicates financing schemes for industrial-type training. If the on-the-job training portion were financed entirely and without strings attached by governments training quality becomes solely controlled by the employer/trainer (we assume here that trainees do not finance training through lower wages and, hence, show little incentives for quality control through mechanisms of self-selection and self-screening into particular programmes and training firms). Employers would in this scenario not be penalized for incorrect decisions in training and since they, furthermore, benefit from an overexpansion of training, excess supplies of inferior and most likely very firm- and job-specific forms of apprenticeship training are the likely consequences. On the other hand, if firms were to finance the on-the-job training portion of apprenticeship training entirely by themselves (and assuming that apprentices receive comparable wages of equally skilled workers) sharp reduction in the overall amount of training and a lengthening of largely firm-specific training (to recoup training costs) would result. It is for these reasons that most financing schemes attempt to combine cost sharing between firms and the public with a balancing of quality controls in training between the partners to the training relationship.

In the case of the British levy/grant system financial and to a lesser degree quality control of training lie with industrial training boards which are composed of equal representation from labour and management plus a representative from government (e.g., from the manpower services commission) and one representative from vocational education. The boards collect training funds from employers (up to 2.5% of employers' wages and salaries) which subsequently are redistributed as grants to those employers who perform training of certain standards as reported by firms (quality control aspect). Small firms in certain categories are exempt from the levy/grant system of financing. The advantages of this scheme lies in the combination of financial and quality control, further reinforced through the ITBs' manpower consulting services and the provision of pressures and incentives to raise the overall amount of training supplies. Drawbacks of the British levy/grant system are its relatively ineffective controls of training quality resulting in uneven training supplies between firms of different size, different sectors and different regions[1] and its large needed bureaucracy to administer the training scheme.[2] It, furthermore, puts little pressure on the education system to prepare young people for work and to change curricula in line with the changing skill requirements of the labour market.

A pure payroll tax credit system works similar to the levy/grant system in that employers set aside (pay) a proportional fraction of their payroll cost for training which they, however, can either execute themselves or delegate to other firm-external educational/training institutions of their choice. The advantage of this scheme is that firms can freely choose among training alternatives and, thereby, apply pressures towards educational institutions to provide training more in line with labour market needs. Since it thus minimizes bureaucratic and legalistic constraints towards the employer, it is less costly in terms of controls at the possible disadvantage of discriminating against some classes of workers and some forms of training (e.g., a company could spend all of its training tax money on management development and none on apprenticeship training). As before, there are no guarantees for sufficient quality control of training and guarantees that individual workers will receive training commensurate with their abilities and potential. To effectively deal with the latter, different countries have sought to complement either financing scheme with measures to enhance the control rights of workers. These can reach from legally established employee rights for training (e.g., France) over codetermination of training through unions and governments (e.g., West-Germany) to collective bargaining procedures (e.g., United Kingdom).[3]

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[1] See, e.g.: B. O. Pettman, "In Partial Defense of the Industrial Training Boards: Some Criticisms Examined," British Journal of Industrial Relations, 1972, No. 2, pp. 225-239.

[2] Further discussions of relative advantages and appropriateness of the levy/grant system for Canada can be found in: Roy Adams, Towards a More Competent Labour Force, A Training Levy Scheme for Canada, Relations Industrielles, Vol. 35, No. 3, 1980, pp. 422-437.

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[3] For a further discussion, see also Appendix I.

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YEAR	HOUSING STARTS (DWE)	CYCLE INDICATORS (REFERENCE CYCLE)
1961	126.5	60.64
1962	128.9	65.61
1963	146.9	69.15
1964	166.2	76.70
1965	166.2	81.95
1966	137.4	86.62
1967	158.1	86.81
1968	195.6	91.83
1969	218.2	99.26
1970	187.2	90.97
1971	231.3	96.22
1972	250.2	114.81
1973	267.5	130.73
1974	227.0	132.76
1975	224.8	115.62
1976	274.6	129.66
1977	243.5	133.41
1978	234.0	141.89
1979	197.8	147.74

Source: Original data, Stats. Canada, published by Singer Associates, Original monthly data aggregated by forming a 13 month moving average entered at mid-year point.

YEAR	REGISTRATION IN CONSTRUCTION*	TOTAL VACANCIES[1]
1961	2667	
1962	2803	
1963	2640	
1964	3151	
1965	4244	
1966	5753	
1967	6714	
1968	6751	
1969	6835	
1970	6354	
1971	891	6311.1
1972	5457	14220.4
1973	8531	17287.7
1974	10412	22955.1
1975	26825	12728.9
1976	31344	10354.3
1977	12436	8670.30
1978	17479	6698.09
1979	17376	
1980		

*Includes Apprenticeship in occupations whose classification numbers are: 8782, 878l, 8733, 8711, 8785, 8791, 8337, 8783, 8799, 8795, 8793, 8794, and 8787. Data entered at mid-year point.

1) Vacancy data for apprenticeable occupations (33 trades) from job vacancy survey, Statistics Canada.

D I S C O N T I N U A T I O N S

Year	NFLD	PEI	NS	NB	QUE	ONT	MAN	SASK	ALB	BC	YUKON	NWT	CANADA TOTAL
1961	38		74	94		674	155	312	988	384			2719
1962	108		56	127		873	181	295	871	277			2788
1963	373		116	152		840	223	328	1107	265			3404
1964	40		126	153		996	360	275	1085	298			3333
1965	42	7	195	207		1312	264	293	798	275			3395
1966	131	29	264	470		1735	231	389	1112	620			4985
1967	133	23	287	575		1875	214	483	943	590			5153
1968	105	18	275	580		1797	215	448	1063	547		25	5073
1969	82	11	401	498		2209	304	537	1029	1113		12	6196
1970	56	15	382	341		2390	193	543	1152	1254	1	15	6342
1971	22	15	282	191		1393	113	284	748	1111		1	4160
1972	71	28	407	494		2337	225	383	1165	1382	5	16	6517
1973	51	12	497	800		2070	243	421	1264	1892	2	47	7299
1974	199	17	462	706		3228	346	631	1305	2171	3	39	9107
1975	250	77	1196	660		2981	351	493	1435	2112	8	47	8911
1976	335	74	442	594		3011	360	531	1644	2414	11	47	9403
1977	196	54	612	744		3813	325	489	1623	2592	15	51	10514
1978	327	52	714	825		2562	386	698	1900		17	126	10965
1979	251	82	487	649		4281	369	399	2389	2656	4	120	16747
1980													

Apprenticeship Data used for figures 1 - 5 *

REGISTRATIONS

YEAR	NFLD	PEI	NS	NB	QUEBEC		ONT	MAN	SASK	ALB	BC	YUKON	NWT	CANADA TOTAL
					Total	Const.								
1961	374		442	510			2450	598	485	1847	669			7375
1962	250		268	428			2686	488	495	2037	1096			7748
1963	142		389	516			3114	359	459	2227	1033			8239
1964	222	15	559	504			4663	415	525	1925	1212			10046
1965	338	29	639	987			5159	453	850	2206	1761			12461
1966	662	44	834	1100			5571	491	1096	3067	2677			1555
1967	521	52	837	1398			7357	539	1004	3187	2265			17190
1968	473	37	785	1051			6090	559	1117	3147	1688		44	14990
1969	289	40	905	689			6887	660	926	3209	4780		38	18423
1970	317	41	870	881			6561	695	748	3520	2164	5	48	15850
1971	232	39	924	368			4012	461	481	1515	1954	3	25	10010
1972	558	88	906	1221	13794	9377	7045	687	731	2981	4013	6	50	18293
1973	685	67	1229	2248	4321	2553	7617	1046	938	3543	4377	11	86	21840
1974	887	161	1336	1628	9049	5178	8460	957	913	4031	6026	13	123	24535
1975	977	159	1760	1821	9872	3830	9556	999	1230	5398	6551	8	167	28625
1976	1381	152	1821	1884	5923	3761	9235	912	1172	5849	6160	40	116	28722
1977	764	136	1185	1397	7491	5025	9722	1056	1446	6353	5402	39	155	27655
1978	812	154	1277	1169	3486	2389	9818	1016	1890	6864		50	155	23205
1979	870	192	1606	1437	3241	1846	11139	1048	1336	8724	6970	38	157	33517
1980	871	109	1308	1208			10576	1096	1735	10518	7801	62	114	35398

* Annual Registration, Discontinuation and Completions are entered at mid-year point.

COMPLETIONS

YEAR	NFLD	PEI	NS	NB	QUE	ONT	MAN	SASK	ALB	BC	YUKON	NWT	CANADA TOTAL
1961	193		117	199		1689	374	145	900	635			4252
1962	224		100	269		1840	310	205	897	536			4381
1963	165		171	200		1496	279	257	981	619			4168
1964	115	1	199	238		1793	295	205	900	483			4229
1965	125	4	213	206		1961	218	184	800	535			4249
1966	127	5	277	409		2223	194	227	1084	920			5468
1967	218	6	221	360		2975	234	277	1183	1061			6537
1968	249	9	232	454		3635	430	372	1366	836		5	7589
1969	229	16	401	309		3750	294	471	1606	1581	24	5	8686
1970	224	17	419	609		3569	348	489	1940	1114		11	8740
1971	214	8	403	254		2427	213	125	1043	1063			5758
1972	373	31	536	538		4293	362	390	1999	1769	2	13	10311
1973	258	17	653	507		3685	406	278	2016	1736	5	20	9581
1974	378	18	614	590		4237	459	227	1838	1732	4	26	10123
1975	311	8	792	621		3823	486	240	1791	1865	3	40	10192
1976	571	52	790	679		4404	480	247	1986	2956	11	26	12202
1977	592	76	857	790		4700	545	295	2323	3341	14	46	13579
1978	827	77	957	837		4938	625	536	290	3283	14	39	18105
1979	690	78	836	789		5696	637	646	3605	3227	14	63	18599
1980													

POOR

QUALITY

ORIGINAL